

CZECH TECHNICAL UNIVERSITY

Faculty of Civil Engineering
Department of Construction Technology



Bachelor thesis

A MULTILEVEL APPROACH TO MEASURING OF INDUSTRIAL AREAS
DUE TO THE RISK OF FAILURE IN TECHNOLOGICAL PROCESSES

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In Prague

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Martin Zigo



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I would like to say thank you to Ing. Alexander Kravcov, Ph.D. For his time and recommendations, he shared with me. I would also like to thank my ex-girlfriend for showing me tips on how to work Microsoft Office products more efficiently.



Abstract

This bachelor thesis deals with the design of industrial areas especially the design of industrial areas where production is being handled and focuses on the analysis of risks accompanied by the manufacturing processes. Describes the risks arising from these processes and illustrates some specific causes of these risks. Several precautions, recommendations and recommended architectural designs/predispositions are being proposed, which implementation could eliminate existing and future risks.

Keywords

Industrial buildings, steel production, manufacturing process, design, risk assessment, mitigation plans



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Introduction

This bachelor thesis is aimed at the design of industrial zones for production. It is focused mainly on the safety aspects and mitigation plans in case of any danger occurs.

The content of this thesis are the safety precautions in terms of electrical interior supply, gas detection, and fire safety solutions. It also discusses the matter of evacuation from the object.

The goal of this thesis is to propose a suitable solution for safety and emergency escape plan of the personnel working in the object that fits the technological processes that are being performed there.



Used shortcuts:

FA.....Fire Alarm

EER.....Emergency Escape Route

FADS.....Fire Alarm and Detection Systems

FSE.....Fire Safety Engineering

TS.....Total Stop

CS.....Central Stop

RDP.....Remote Desktop Protocol

GF.....Ground Floor



CONTENT

INTRODUCTION

1 HISTORY	1
1.1 HISTORY OF INDUSTRIAL AREAS IN CZECHIA	1
1.2 CATEGORIZATION OF INDUSTRIAL AREAS	8
2 DESIGN OF INDUSTRIAL AREAS	10
2.1 DESIGN OF INDUSTRIAL AREAS FOR PRODUCTION	10
2.2 DISPOSITIONAL DESIGN OF MULTI-SHIPED FACILITIES	13
3 METAL PROCESSING INDUSTRIAL AREAS.....	20
3.1 CHARACTERISTICS OF ENGINEERING FACTORIES	20
3.2 URBANISTIC AND SITUATIONAL REQUIREMENTS	21
3.3 FUNCTIONAL DIVIDING OF THE METAL PROCESSING FACILITIES	23
3.3.1 Default information for the general solutions	23
4 RISK ASSESSMENT AND MITIGATION PLANS	27
4.1 RISK ASSESSMENT AND HAZARD MANAGEMENT IN A METAL- PROCESSING PLANT	27
4.1.1 Introduction	27
4.1.2 Identification of a hazard	30
4.1.3 Identify the risk	31
4.1.4 Asses the risk	32
4.1.5 Control the risk	32
4.1.6 Document the process	33
4.1.7 Monitor and review	34
4.2 MITIGATION PLANS	34
5 PROJECT APPLICATION	36
5.1 ARCHITECTURAL AND DISPOSITIONAL SOLUTION	36
5.2 DESCRIPTION OF PRODUCTION TECHNOLOGY	38
5.2.1 The production process of the steel cord	39
5.3 FIRE SAFETY.....	41
5.3.1 Fire safety approach	41
5.3.2 Technical fire characteristics of used substance.....	45



5.3.3	The division into fire segments.....	46
5.3.4	Classification of the fire resistance level	48
5.3.5	Fire intervention.....	50
5.4	GAS DETECTION	50
5.4.1	Detection of gas regulation station	50
5.4.2	Detection of gas heaters „SAHARA“	51
5.4.3	Detection of a gas leak in hall 1.35.....	52
5.4.4	Detection of a gas leak in the boiler room	52
5.4.5	Detection of ammonia.....	53
5.4.6	Detection of a gas leak in hall 1.33A.....	54
5.4.7	Detection of a gas leak in hall 1.72.....	54
5.4.8	Detection of a gas leak in the boiler room in lockers	54
5.4.9	Power supply	55
5.5	ELECTRICAL INTERIOR-HEAVY CURRENT.....	55
5.5.1	Electric power supply	56
5.5.2	Protective zones.....	56
5.5.3	Safety ensurance	57
5.5.4	Type of grounding system	57
5.5.5	Protection against thermal effects, excess currents, failure currents	58
5.5.6	Emergency shutdown	58
5.5.7	Protection against lighting and excess voltage	58
5.6	PRECAUTIONS IN CASE OF FIRE	59
5.6.1	Level of fire signalization.....	59
5.6.2	Configuration of the FA regime	60
5.6.3	The operational crew of the FA.....	60
5.6.4	The scenario of FA operation in case of fire.....	60
5.6.5	Response strategy to fire alarm	61
5.6.6	Fire detection	61
5.7	EVACUATION PLAN.....	62
5.7.1	Personnel occupancy	62
5.8	DESIGN OF EMERGENCY ESCAPE ROUTES (EER)	66
5.8.1	Design of doors along the EER	66
5.8.2	Design of staircases along the EER	67
5.8.3	Indication of the EER	67

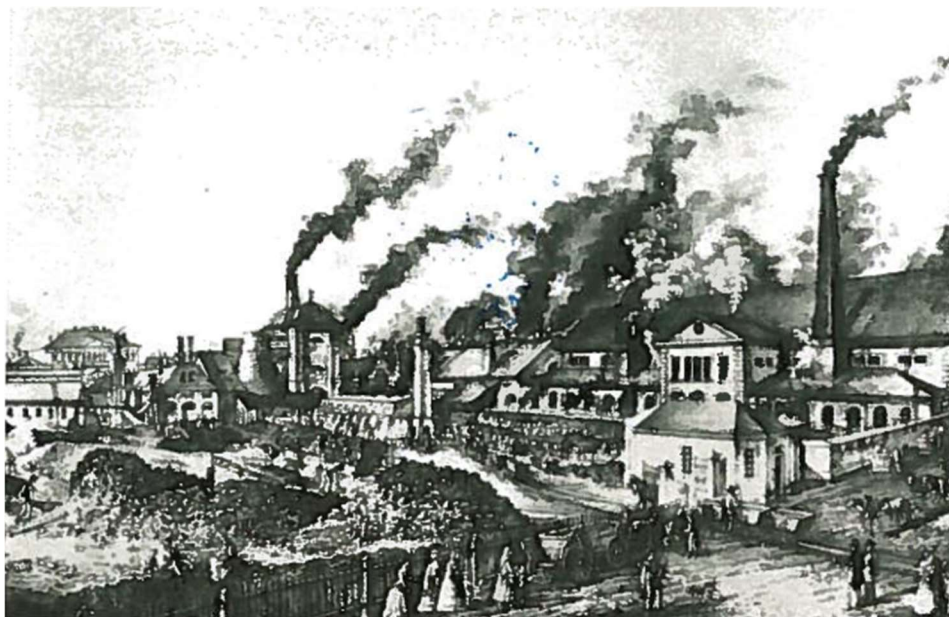


5.9	DESIGN OF THE SAFETY DISTANCES	67
5.9.1	Evaluation of the safety distances	67

1 HISTORY

1.1 HISTORY OF INDUSTRIAL AREAS IN CZECHIA

As well as in any other field of Civil Engineering, for the design and construction of industrial areas, it's crucial to figure out and understand the new technologies. In order to do that, we need to understand the usage of past ones. It's the categorization of reinforced concrete constructions and normalization of basic rules for the designs of general industrial areas. Understanding these concepts will allow us to understand our tasks more deeply and help us to be more accurate in the decision-making process for our future projects of construction.



Picture 1: Metal-processing facility in Ostravsko region from the first half of the 19th century [3]

Czecho-Slovakia was 7th in the world in the steel production industry and 9th in the black coal mining industry already back during the phase of the first republic. However, around the end of the 19th century and the beginning of the 20th century was the industry quite spread out and technologically immature compared to the advanced west-world. The small factories and very small factories had a numeral advantage at this time. Around the year 1900, there were around 2500 Czech and 2400 German production factories, which



had from 20 to 100 employees. A number of factories that were owned by Czech people and had more than 300 employees been around 160. The significant effect for the future evolution of the industry in our region, as well as worldwide, was the construction of railways. From the second half of 20th century, we can observe the tendency of continual expansion of these so-called light industry (textile, glass, breweries) and partly food industry, where no big financial funds were needed. That meant that the industrial areas were built in a short amount of time, resulting in a quick profit for the investor. The soap production factories were along with breweries the first bigger industry in Prague. The beer-brewing industry was suffering from the lack of professional knowledge in the early days. In 1910 there were 1146 breweries in Czechia region, from which every single one of them produced 10 000 hl/year [3]. The big demand for alcoholic beverages at the time is supported by the fact that there was also a great number of distilleries, there was 66 of them just in the Prague location. Until the end of the 19th century, there was a development of enterprises from another industrial field as well. The old water mills were being replaced by big steam mills, big paper production factories were being built as well as cellulose factories. After the year of 1870, after the invention of the dynamo, begins the construction of electrical power stations. The construction industry has its big centers in Radotin near Prague and then in Šumperk, where the asbestos-cement goods are being produced. From the second half of the 19th century were printing facilities being expanded into big enterprises as well. The growth of the light industry is backed-up by these statistics:

Year:	A number of factories:
1850	10
1860	17
1870	46
1914	733

Table 1: Development of factories [3]

During World War I. was the majority of industries being adapted to war-related production (weapons, army gear, ammunition). The enterprises, especially the small ones, are not being maintained by their owners during the war. The consequences of unplanned growth and location of enterprises were being shown, due to limited transportation possibilities caused by the on-going war. After the end of the war and the liberation of Czechia, the majority of Austro-Hungarian Empire industry remains on our territory, approximately 70 %. [3]

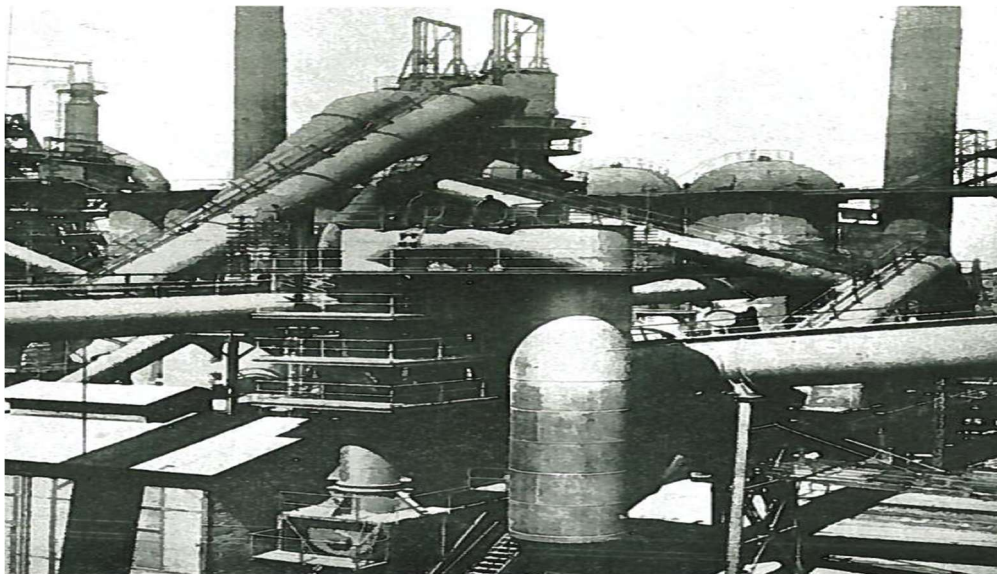


Picture 2: Steel-production factory in Vítkovice in 1870 [3]

Two particular problems that had to be considered occurred at this stage, the industrial business and non-planned constructions were causing the insufficient competitive ability against the west-world. It is the great demand after utility stocks, which lasts approximately until the year 1925 and has a world-wide scale. After the year of 1930, these components are starting to lose its impact and the unemployment was continuously rising, especially in the light industry which was focused on the western markets. The crisis was striking also our agriculture and its industrial components. The ongoing crisis took its toll on the industrial buildings as well. The maintenance level of constructions as well as the machinery was becoming poorer and poorer. The maintenance budgets were getting cut to the minimum, the enterprises were falling apart. Owners of the industrial areas weren't concerned about their employees



at all. The sanitary equipment provided, if there was any, was on a very low level and there was no interest in investing into new modern production technologies neither since there was no guarantee insufficient demand and there was plenty of cheap labor present. The main architectural contour of the newly built industrial constructions from in-between the years of 1920-1935 was its plain formalism. Majority of these constructions, even whole enterprises were usually fulfilling just the most important requirements, which are needed for the operation of the factories. The constructional and social modifications are developed only enough so the production process would not be interrupted. If we could even talk about any sort of architectural aspects of these buildings, it was in the most cases really far away from any kind of aesthetic feeling for the working class and its ideas of beauty.



Picture 3: Steel-production factory in Vítkovice after year 1920 [3]

In case of the “richer” architectural approach, there was preferably the usage of inadequate, so-called “representational” materials, very expensive load-bearing constructions which usually had a very low life expectancy and were really hard to maintain. The occupation period (1939-1945) has left us some doubtful legacy in terms of industrial constructions as well. During World War II. The Germans are expanding our industry, especially the branch of heavy engineering and chemistry. On the other hand, the other branches of our industry are being ignored and they are getting into an even worse status that they were before (during the crisis), the life expectancy of the industrial

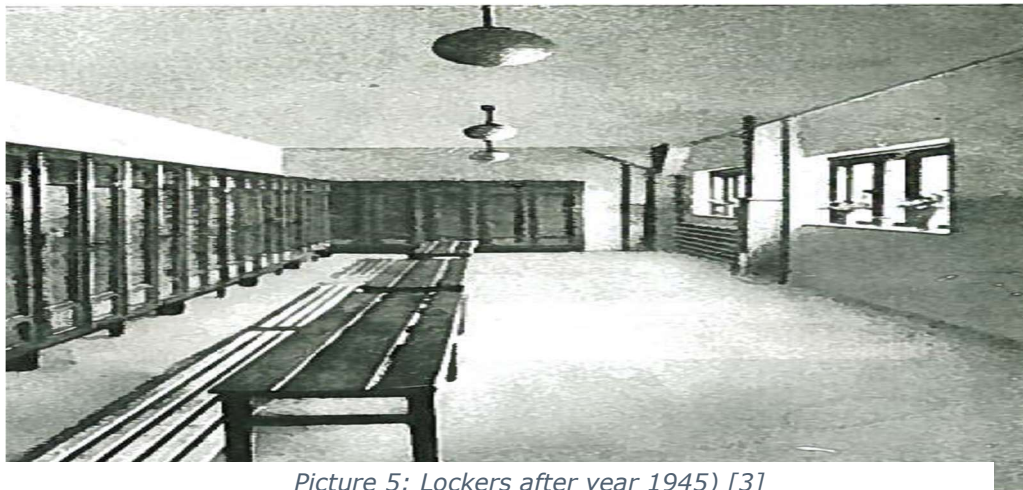


buildings from these fields of the industry is getting lower. The retrieval of our industry would be possible even by a great and very expensive reconstruction at this point. The Year of 1945, the year of our liberation from Nazi occupation had given us this opportunity on a full scale. The new government took the reconstructions as its primary goal for future development. The main branches of industry the government invested to were the ones with the most significance (at the time): Mining industry (black coal, iron ore, oil), Metal-processing industry, Energetic industry (electric power, gas), Steel-manufacturing industry (train equipment production, agricultural and constructional machinery production) and Chemical industry (gas production, diesel production). The factor of the biggest influence to achieve this goal was the nationalization of production in 1945. All the big branches of the industry at the time were taken away from the possession of businessmen and were taken under the possession of the state. In the case of the food industry, the nationalization meant that they united the whole food production and the Ministry of Nutrient reference values was created, all the other branches were governed by the Ministry of Industry. Unfortunately, at the time there was no such thing as a united approach for the urbanistic and architectural solutions. Projects of the industrial areas after the year of 1945 were still just following the previous architectural concepts, and there were still not designed the way the working-class needed. The lack of sufficient technological level of design, as well as the generation gap, strongly impacted the construction and reconstruction processes on a large scale. On 28th of October 1948, the Czech-Slovakian government announces its 5-year plan for its development. In comparison with the first 2-year plan that was supposed to regain the economy of recently liberated republic, the 5-year plan was more complex, set to build the foundation to continual improvement of the life quality for all the people living in the country. The plan consisted of five main points, the most impactful one was the goal of automatization of production processes by investing in new technology development. The industry field was a leader in economic expansion at this point in time. The new economic period has invested a lot of funds into the field of industry, allowing the increase in production and implementation of new advanced approaches in the working

process. This leads to the tendency to an increase in productivity but more importantly this was the first time the health of the workers was taken into consideration and they did not have to do health-threatening activities.



Picture 4: The common type of lockers before year 1945 [3]

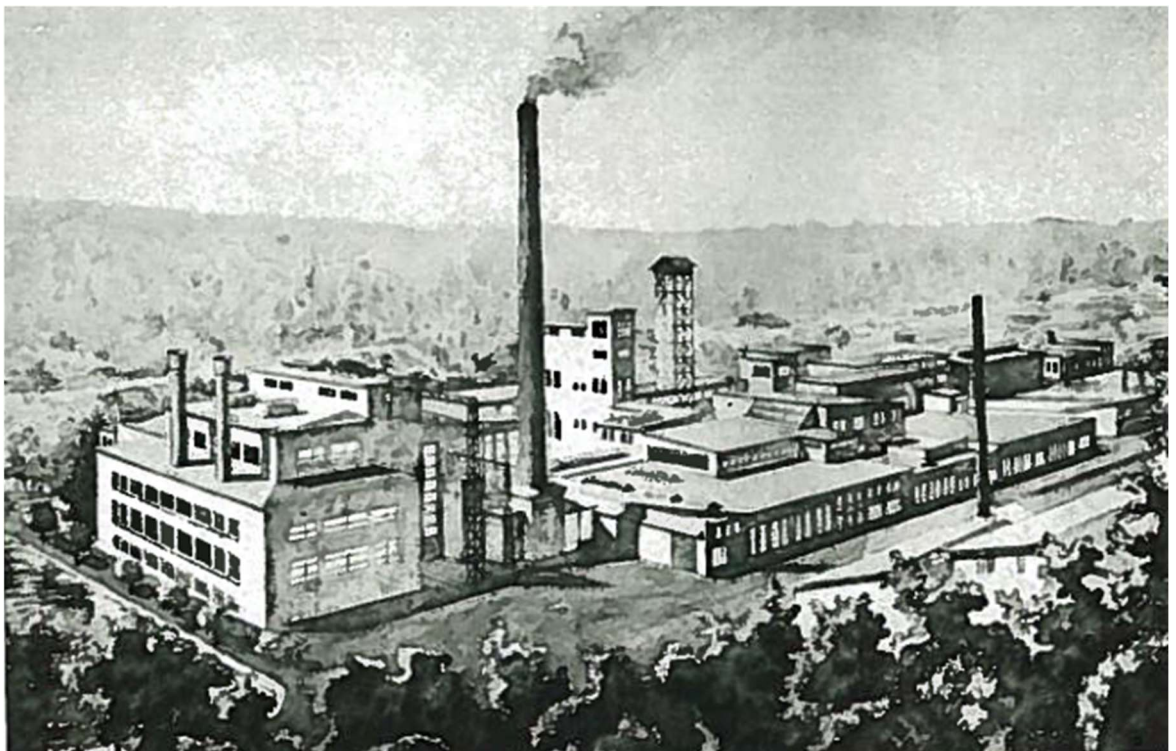


Picture 5: Lockers after year 1945) [3]

During socialism was the industry oriented mainly towards the mining industry and arms industry. The industry grew 371,9% until the end of 1960 and by 665,5% until the year of 1970, it kept slowly growing until it grew by astonishing 1322% until the year of 1985 in comparison with the year of 1948. [3]. The most significant branches of industry in 1985 were the Electrical in-



dustry, Engineering industry, Metal-processing industry, and Chemical industry. Some of the most produced products were cars, airplanes, electrical appliances and goods transportable by railway. In the early 80s as a part of the “reconstruction” plan of industrial economics, the government tried to put effort into the selection of the industry branches. They tried to decrease the importance of some fields in Metal-processing industry in favor of the more profitable, less energy consuming industries. In spite of the significant position of industry in the mid-80s, there still were major drawbacks. One of the most significant troubles was the amount of energy and material required for the products. The Czech-Slovakian machinery was often way heavier and less efficient in comparison with the machinery used in Western-Europe. After the fall of Communism in the year 1989, the process of privatization took place. There were several methods of privatization: small privatization, big privatization, and restitution. The big privatization dealt with the major branches of industry and the small one took care of the less important ones, such as the Services industry. There was plenty of shays moves happening during this period.



Picture 6: Industrial area of Paper-production factory (an example of complicated urbanistic concept) [3]



1.2 CATEGORIZATION OF INDUSTRIAL AREAS

The general name – industrial area-is basically a term that is very common and broad. This is extracted from the many fields of the industry itself. In spite of so many known faces of the industry, the industrial areas have many common features. These similarities, sometimes even identities of the areas are derived from the common requirements for the operation that are set by the whole bunch of different branches of industry. For instance, every single industrial area has an administration building, which is usually very alike compared to administration buildings from other branches of industry. Storage units have lots of common features as well, a big amount of them are designed the same, regardless of the type of industry they are used for. On the other hand, it's obvious that even areas where the operation process is very much alike, there can be some huge differences based on the different size of the area where is the factory constructed as well as there can be differences due to the type of production. For example, there are factories that have bigger requirements for the administration processes due to co-operation between the factories (even between branches of industry). This results in the greater size of the administration objects in comparison to a factory that does not have such a wide specialization. When coming to contact with such a diversity of production, it is just natural that also some kind of similarities will occur. These similarities are giving us the fundamental know-how for the systematic distinction –categorization– of all different kinds of industrial buildings and areas. Nowadays, there are several main aspects by which we are distinguishing the industrial areas. The most important one is the aspect of function also known as the aspect of purpose. By the term of „aspect of function“ in this dividing we mean the particular functions of buildings and areas, not the division into single-purpose buildings and multi-purpose buildings. That means that when we consider, for example, the administration buildings we take into account the operational function of the administration building. Or the function of the production process when is the production building being considered.



The industrial areas(objects) are by function divided into: [1]

a) Objects of all-around character,

- administration objects (Admin. buildings)
- educational facilities (training institution with workshops)
- sanitary facilities (showers, toilets, lockers)
- gastronomy facilities (kitchens, dining rooms)
- safety facilities (fencing, guardhouse)
- green areas

b) Objects of the main production

Objects of auxiliary production,

- maintaining workshops
- research objects (laboratories, research institutions)

c) Objects of factory transportation

- railways
- roads
- canalization (piping, water towers)
- garages

d) Objects for storage

- raw material storage
- storage of semi-products and products
- storage of fuel masses (gas, oil)
- storage of garbage

e) Objects for energy accumulation

- objects of energy production (power stations, generators)
- objects of energy transportation (wires)
- substations

f) Recreational objects

g) Mining objects (e.g. quarry)

As we can see, there is really a huge amount of industrial areas types. The main ones are considered to be: objects of the main production, objects of auxiliary production and objects for storage.



2 DESIGN OF INDUSTRIAL AREAS

2.1 DESIGN OF INDUSTRIAL AREAS FOR PRODUCTION

For almost every single industrial building or area we need to distinguish a couple of different points of view, in order to do that we need to consider these industrial buildings or areas as one functional object. We distinguish these points of view: [1]

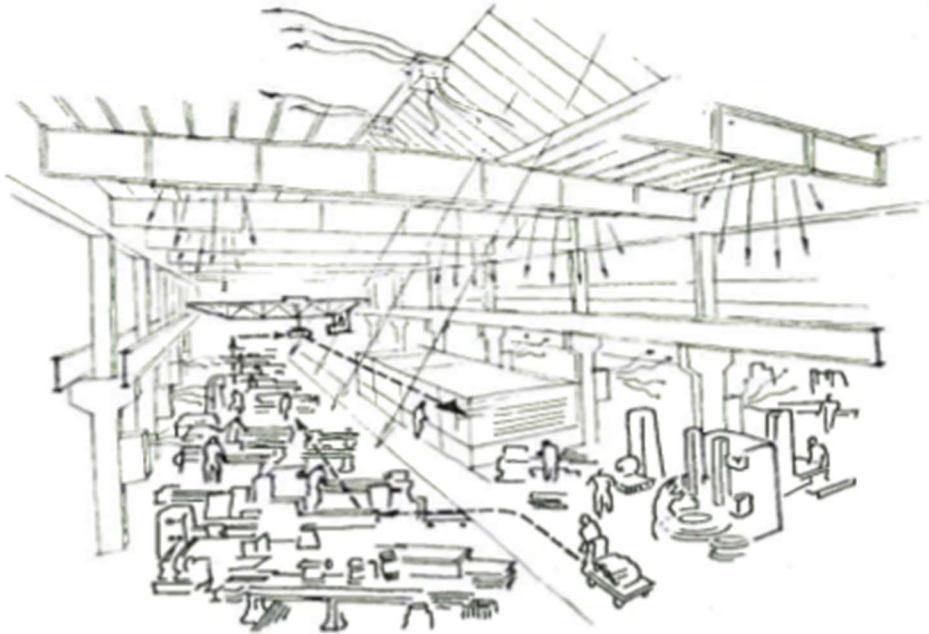
- a) **Conditions of production** (manufacturing process, machinery equipment, transportation equipment, and assistance equipment)
- b) **Working environment conditions** (temperature conditions, moisture conditions, ventilation equipment, sanitary conditions, esthetical and cultural conditions within the factory)
- c) **Structural constructions of the buildings and areas**

The crucial deciding requirements for the investment into the construction of industrial areas are:

- a) **Functional requirements of the area** (operation purpose of the area)
- b) **Economical requirements**
- c) **Requirements of the workers**

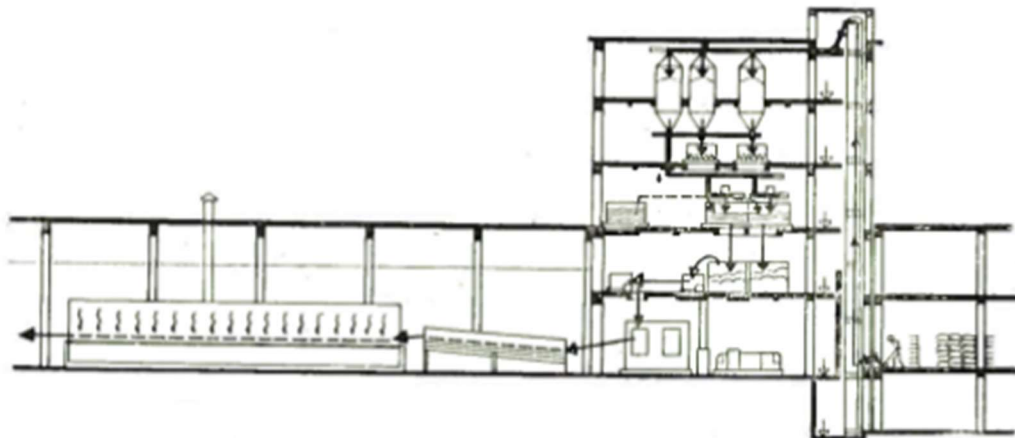
Following these requirements in particular parts of the area should go hand-in-hand with the overall design of the area in order to accomplish the most efficient production area. While doing this, it is definitely needed to look at things from the angle of a professional manager, who has to take into consideration the long-term well-being of the production area. In terms of the technology for production that is the production area already providing, as well as in terms of innovation of this technology. The manager's task is also making sure that the production area has sufficient productivity while maintaining adequate working environment conditions.

The term production conditions include all of the following aspects: machinery, transportation equipment, materials that are going through the factory, energy distribution network and all the people working or simply moving through the area.



Picture 7: Production conditions, work environment and construction as a united object [1]

One of the main components is the requirement, that the production has to be a situation in a building. The fundamental relationship between the production technology and the building can be perceived in how far the building is reaching with its structural construction and the adaptation of its production line.



Picture 8: Production flow in a bakery: chemical and mechanical processes are continuously taking place in technological devices within separate floors [1]



This relationship is expressed as the dispositional solution of the building. By this, we understand the ground and spacial order of the structural constructions according to the requirements for production technology and also others, production-related assistance processes as well as the work environment requirements. Majority of the industrial productions are based on a horizontal movement along the area in combination with its own technological processes and transportation.

The production flow in a vertical direction rarely exists. As a vertical direction of a production flow could be considered the melting of an ore in a high oven for example. However, the technique of a free-fall is being used in the production process quite often. Especially, where storage accumulation of materials or products is advantageous. The selection rooms are an exception though, where the free-fall is used to separate the material based on the size differences of it. The production flow within the building is done in a horizontal direction along the area and can be designed in various ways. The variety of the designs depends on required technologies, types of transportation and the location of load-bearing constructions.

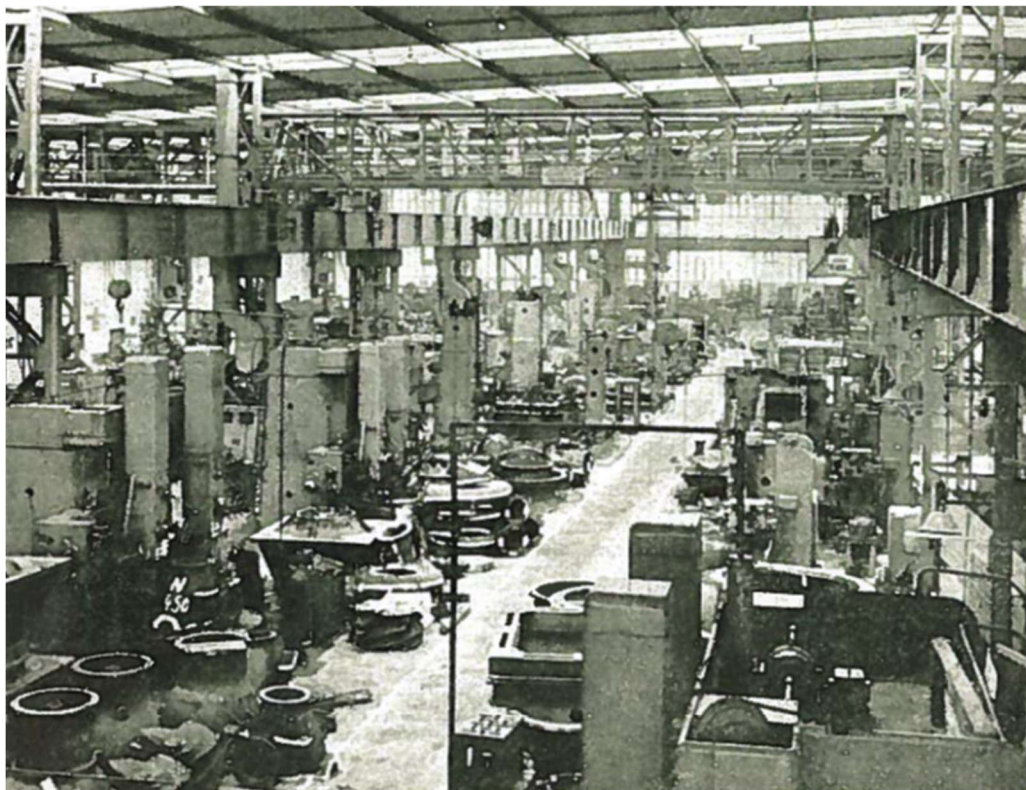
In the case of production technology, the type of production is the deciding factor (mass production/single production). Consistency, various types and weight of the products are playing a key role in the decision-making process in terms of the type of transportation. Types of transportation can be very different. Let's take a steel-producing factory as an example, where the huge casts of steel with the weight of several tons are being transported by heavy cranes, and the chemical production, where the product-liquid-is being transported by piping. With the continuous development of mechanization there comes more possibilities and types of transportation methods.

2.2 DISPOSITIONAL DESIGN OF MULTI-SHIPPED FACILITIES

With a continuous straight-lined composition of one-shipped buildings, the multi-shipped buildings are being developed. We distinguish a couple types of industrial multi-shipped buildings: [1]

- a) Buildings for light production
- b) Building for semi-heavy production
- c) Buildings for heavy production
- d) Buildings for very heavy production

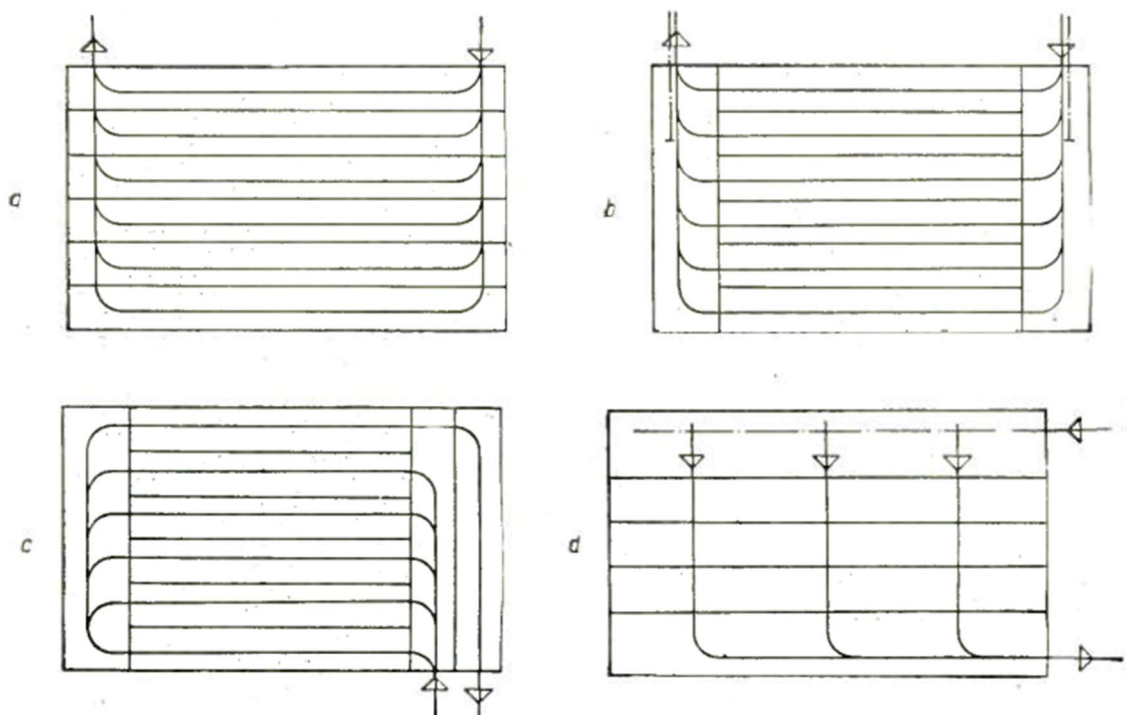
As far as buildings for light production go, the production process here is mainly of a mass-production character with a high level of mechanization even automatization. The production is focused on the very accurate treatment of smaller objects (production of small devices, production of electronic devices) or in the treatment of soft products (textile, groceries). The mass of these products ranges from 1kg-50 kg. [1] The transportation in these kinds of buildings are usually managed by conveyors or the transportation devices are attached to the roof structure. The buildings for light production are the most



Picture 9: Semi-heavy production engineering building [1]

flexible ones in terms of the sudden change of production. The production machinery is light fairly small so their disposition can be easily changed. The composition of ships is very simple in these cases, the ships that are alike are connected next to each other, usually without any other production areas of a different character.

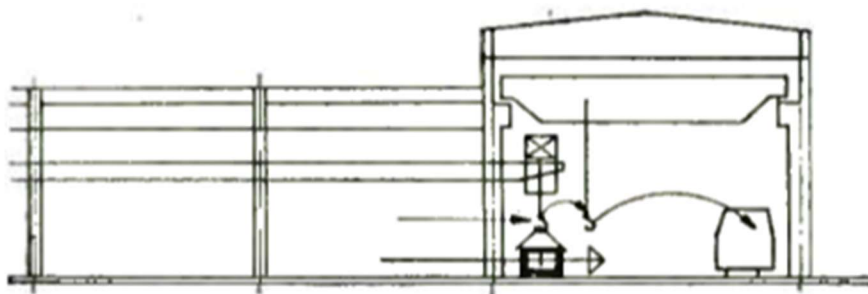
In case of buildings for semi-heavy production, the production is usually serial with a middle level of mechanization. Its character is in the accurate treatment of products (engineering production e.g. air-conditioning systems or agricultural machinery) or in the rough treatment of semi-finished products (timber industry, chemical industry). In the class of middle-engineering are these types of buildings the most common ones. The approximate count of ships in these buildings tends to be lower (2 to 3 ships). The mass of products ranges from 50kg up to 1000 kg. [1] The transportation is taken care of by cranes in case of the heavier, big-sized products. The smaller pieces are being transported by conveyors.



Picture 10: a) parallel disposition of production ships, b) production ships ended from both sides with transversal collecting ships, c) set with collecting ships that are parallel to production ships d) disposition with collecting ships parallel to production ships [1]

The machinery for production can be of different sizes and character. The heavier devices need to have quite a big foundation and that's why the change of their disposition can be expensive. Dimensions of these buildings are greater compared to the buildings of light production, especially the height is greater. In the case of ship-joining, there is also a transversal joining technique used in addition to the lateral one. This technique is usually used mainly for storage purposes or material preparation.

The collecting ships are usually wider and higher to enable easier transportation of material from conveyors by cranes.



*Picture 11: Transport of products from production ships into collecting ones
by console cranes [1]*

Considering the building for heavy production, the production is mostly unit production with a low level of mechanization. Its character is based on the processing of heavy products in the engineering industry, such as heavy diesel engines, compressors, turbines, and heavy agricultural machinery. Heavy cranes are used as transportation tools in these buildings, with carrying capacity from 20 t to 50 t. [1] There is just an increase in height of the building and the collecting, so-called transversal ships are equipped by cranes with higher carrying capacity. Otherwise, these buildings are very alike as the ones for semi-heavy productions. The same disposition of machinery is used here.

As far as buildings for very heavy production go, there is mostly unit production or even production of unique products. The products are of very big size and great weight (e.g. parts of ships or very heavy machinery). This results in a huge carrying capacity of cranes, which is up to 100 tons sometimes even



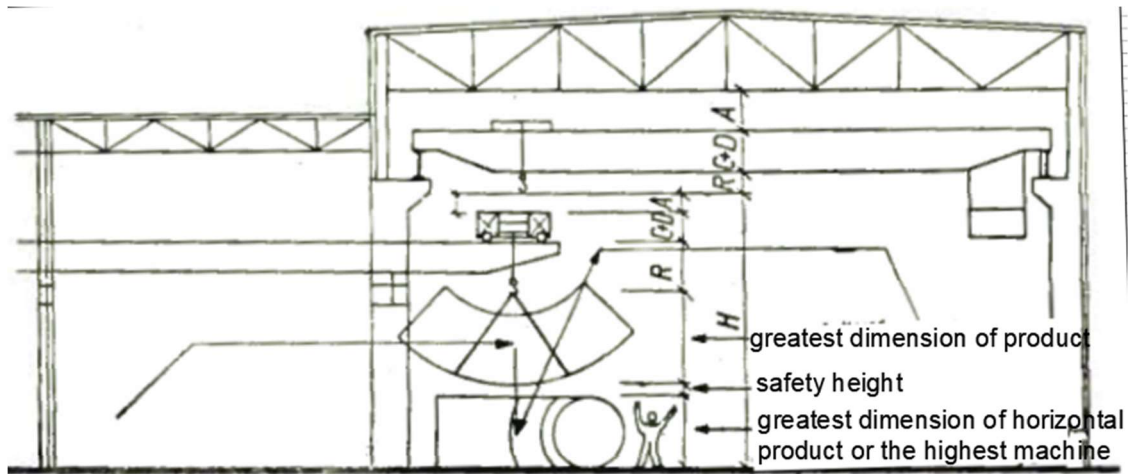
up to 300 tons. These buildings are naturally of very great height, their height exceeds 20 m. The huge loading impacting the cranes is being transmitted to the load-bearing structure of building during the movement of the crane, this results in over-dimensioning of the roof structure. This impacts the volume solution of the building in a case the roof construction is built over the whole building (not separated to multiple individual parts). Single-floored buildings have an advantage in terms of production technology, that the production flow is restricted by the load-bearing constructions the least. The economical disposition of production flow in many cases requires differences in height levels by built-in galleries. These galleries can be of various range and located in various spaces of the ground plan. Usually, it's about transportation of materials or products to a particular area of the building, which would disturb the production process if it was located on the same level as the production.

The disposition of height solution in case of single-floored buildings is a pretty complex topic by itself. The requirements of production are influencing the height disposition of a building quite greatly. It is mostly given by the height dimensions of machinery and the space needed above them. In case of simple single-floored buildings, there come two options to mind:

- a) Type of buildings without under-hanged transport would require only enough space above the machinery necessary for its installation. In practice, the requirements of the working environment are the ones deciding the light height of the building.
- b) Types of buildings with under-hanged transport require some additional space above the machinery. This height is equal to the sum of the height of the transported object, the height of the transportation tool and its hinge. For the total light height of the building, it is necessary to examine the whole operation circumstances and the highest possible sum of heights. Also crossing with other objects needs to be taken into account (air-conditioning etc.).

In the case of crane transportation, it is very similar to the second option. The sum of heights considered here: highest machinery, highest

object transported and the height dimensions of the crane as well as the shortest safety distance from the building's roof construction.



Picture 12: Height conditions in collecting ships [1]

Considering the requirements for disposition of distribution networks (energetic, heating, sewage, ventilation) in various parts of the building, we can directly or indirectly influence the building dimensions. The dispositional solution of distribution networks in the areas where production is taking place, in the case of single-floored buildings we consider two options:

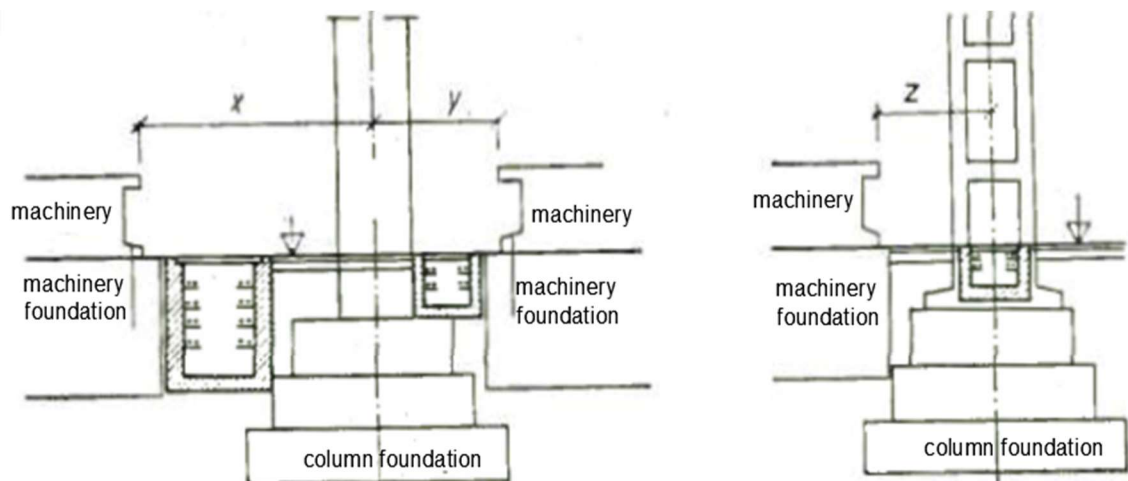
- a) In case of buildings without crane transportation but with under-hanged transportation, it can be hanged freely on columns or on the roof construction.
- b) In case of buildings with crane transportation, they are exclusively hanged on columns, used only where needed and that is in facilities with heavy production.

In both cases, they should not be hanged so they are in the way of the distribution of light coming from lamps.

The first option is not causing any trouble. However, by the usage of the second option there comes plenty of complications. For instance, in case of the distribution network of horizontal piping for heating steam is necessary to use dilatation compensations, which in case of being hanged on columns can interfere with its dimensions into the operation of cranes and even influence the building dimension by this. To ensure that these problems will not occur, there are horizontal planes being reserved for the

distribution networks. These planes are located along the column's axis. There is still the risk of accumulation of too many distribution networks by the usage of this solution. Therefore, the best solution for this is most likely canals formed along with the roof construction, this is not applicable for every type of distribution network as well as building (not suitable for high buildings), but it helps to decrease the total accumulation rate.

The underground distribution networks are always played into canals located under the surface. Their location is decided by the depth of nearby foundation pad. This has a direct impact on the density of machinery disposition (if the machines have a foundation).

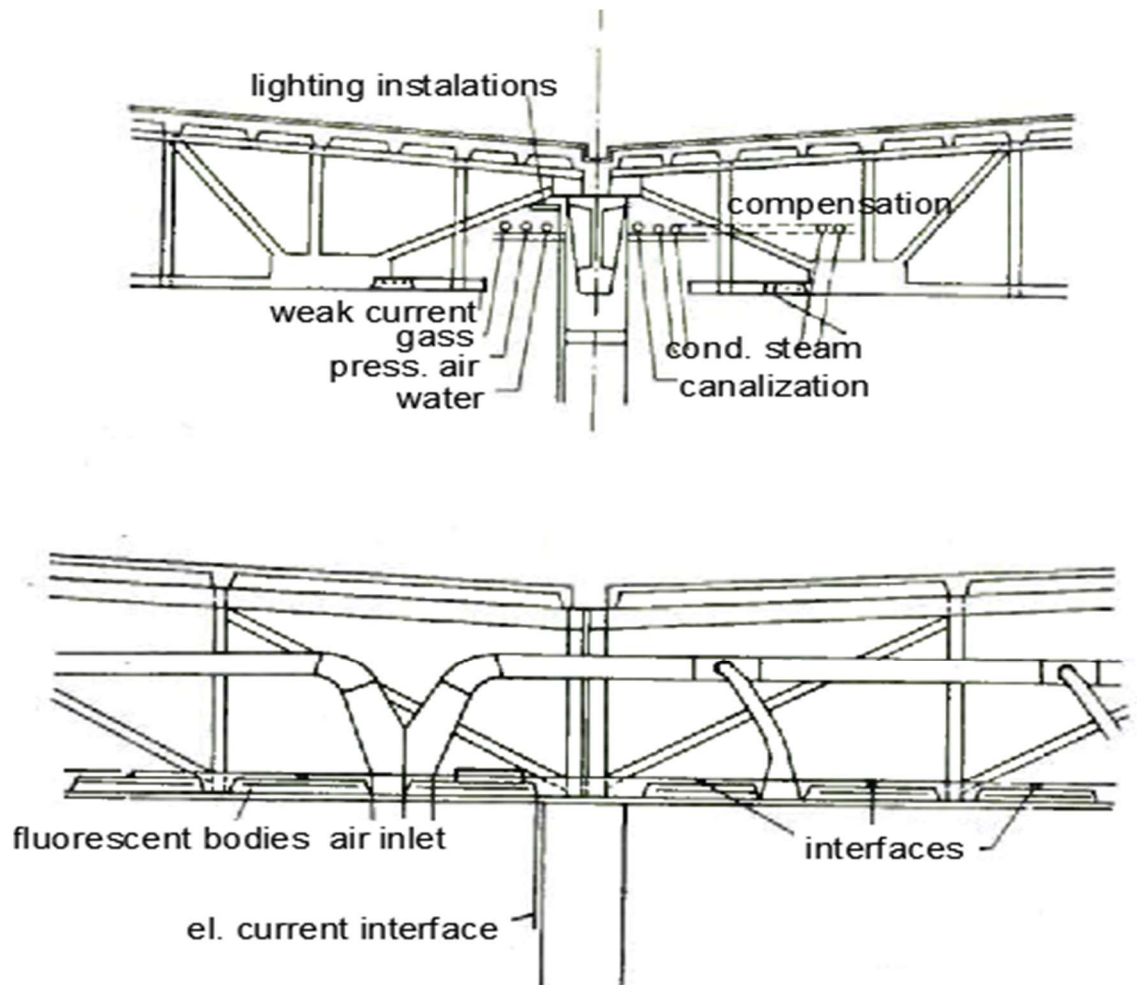


Picture 13: Influence of distribution canals on the dispositional solution of the ship [1]

The second image above shows an example of a solution, where the canal is played under the column (on its axis) which allows a closer situation of the machinery to the columns. This solution has its constructional limits, especially when the canals are supposed to be a bit wider and the columns are too thin for that. The wiring located in canals is more accessible than the one hanged on the columns in terms of maintenance. They are also a safer option in case of a failure. Bigger canals also cause the need for deeper foundation pads which results in higher investment costs.

Locating of wirings in the area of the roof structure is advantageous because these wirings are not influencing the volume solution of building and it

has the least disturbing impact on the production operation. Their maintenance and controlling process are independent of the operation processes.

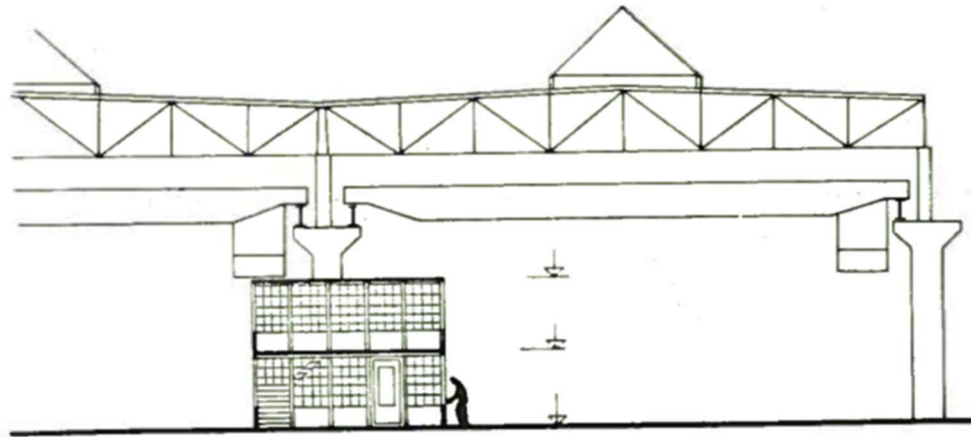


Picture 14: Location of distribution networks under roof structure [1]

This situating of wirings is requiring some conditions on the roof construction. The lower strips of trusses need to be massive and the height of trusses must be sufficient for people to crawl through at least (around 80 cm of light height) along the whole length of the truss.

There is plenty of supporting processes in the production that are directly connected with it. Such as constructional offices, laboratories, storage rooms, and social facilities – toilets, locker rooms, etc. These facilities have its place of more or less significance in the dispositional solution of the building. Depending on what kind of building are we talking about, its purpose, capacity, level of mechanization or number of employees.

There are some more important non-production operations that need to be located directly in production areas. These are storage rooms, small work-shops (e.g. welding rooms). These operations should be located in spots with a lower frequency of operational flow and need to be enclosed by doors with glass or by a wire fence. Sometimes for the sake of space saving, these operations might be multi-levelled.



Picture 15: Storages within the production areas [1]

3 METAL PROCESSING INDUSTRIAL AREAS

3.1 CHARACTERISTICS OF ENGINEERING FACTORIES

The general engineering factories are in categorized as facilities from light to semi-heavy industry of processing character. The borderline between general and heavy engineering is pretty non-stable. The most important differences and categorization of the main groups of these industries are shown in the following table: [2]

Main engineering fields	electronics	precision engineering	semi-heavy engineering	heavy engineering	very heavy engineering
Examples of products	radios, TVs, instruments for measurements, light bulbs	fittings, computers, appliances for household, cameras	agricultural machines, devices for textile production, engines, cars, airplanes	heavy agricultural machines, turbines, compressors, locomotives	hydraulic presses, water turbines
weight of parts processed	up to 100kg		up to 1500kg	up to 10 000kg	over 10 000kg

Table 2: Main types of industrial facilities [2]



In terms of production volume, general engineering represents around 60% and heavy engineering around 40%, however about 10% of the heavy engineering has the characteristics of a general one. Despite, there are some slight differences within the fields of general engineering industry which is impacting the designs of these industrial areas in terms of conceptual study and other factors, the technological nature of production is pretty much the same across all of them. Without any significantly different space-oriented or constructional requirements. The technology in accordance with the character of machinery is very flexible within the building.

All these factors are enabling the changes of production programs, that is why these kinds of facilities are also called multi-purpose facilities. This basic ability has a direct impact in terms of their design.

In comparison with the factories of single purpose and continual production process (steel production, cement production, ore processing). The general engineering products are often the results of multiple processes (or components) that were gained by the processing of basic material (most commonly steel). The production processes always consist of couple phases and each of them has its own main operation: [2]

- a) Pre-making phase (production of half-finished products-casts making)
- b) Making phase (mechanical processes-machining of parts)
- c) Assembly phase (assembling processes)

A production that is taking place in the main, mechanical-assembling areas, is being provided by a big amount of lighter, mostly universal machinery. The general purpose of such engineering facilities is most to be well adaptable to production conditions in quality and in quantity as well.

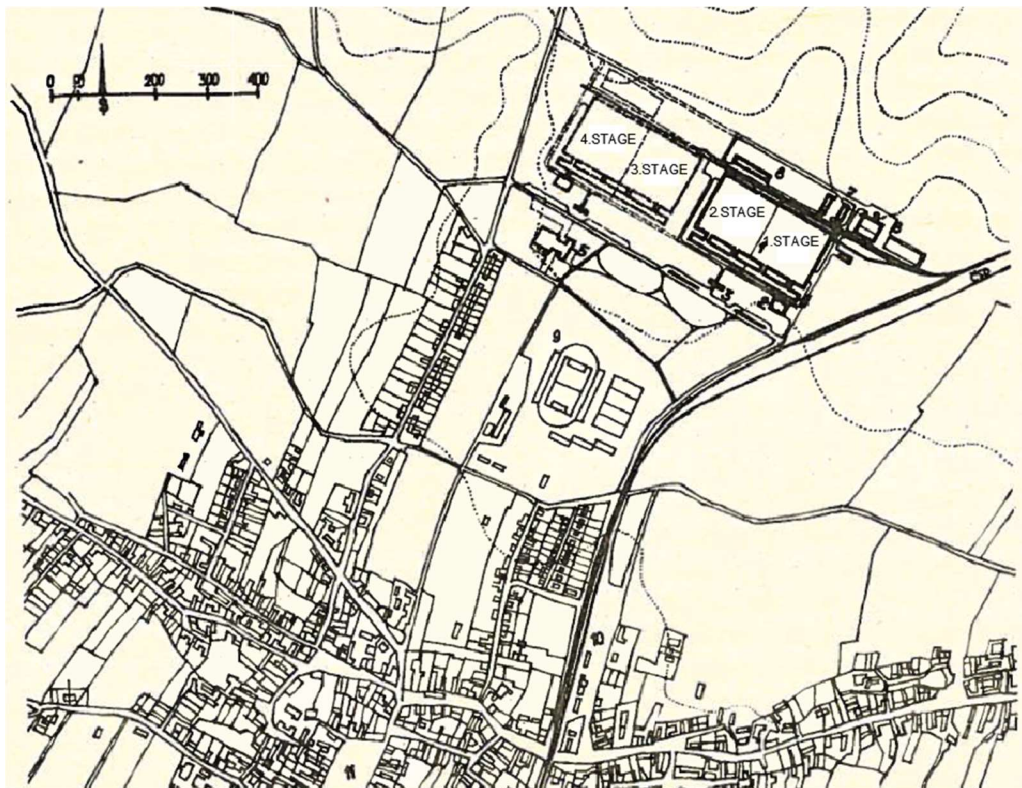
3.2 URBANISTIC AND SITUATIONAL REQUIREMENTS

The rules for the decision-making process for the location of general engineering industrial areas are pretty similar to the ones applied for other fields of the processing industry. In the case of small or medium-sized areas, the crucial factors are a sufficient amount of labor and basic transportation

requirements. Other factors such as energy, water supply, co-operation, etc. are important in case of areas with large capacity.

Then there are some other urbanistic aspects influencing the requirements of engineering areas for the location they are built at. These aspects are always within some specific range of options, according to the type of facility, type of production and according to the size of the facility.

The average values are derived from the as-built and newly designed facilities with a different concentration level of built-up area. It is clear that the categorization of areas due to their size is swiftly changing as time goes by. For example, in years of 1950-1955 were the facilities of 10 000m² – 20 000m² were considered as large-sized nowadays the facilities of more than 100 000m² [2] of ground floor area are considered as large-sized. By the ground-floor area, we mean the sum of all areal ground floor plans.



Picture 16: Location of a mid-sized facility. It is strategically situated in terms of the incoming employees and cargo transport [2]



3.3 FUNCTIONAL DIVIDING OF THE METAL PROCESSING FACILITIES

3.3.1 Default information for the general solutions

1.) Type of production

When deciding the dimensions of a building we need to give big importance to the sizes and weight of the machinery for production and the products itself. The average loading applied in the facilities of precise engineering is: in the areas of mechanical processes 1500-2500 kg/m², in the areas with assembly processes 750-1000 kg/m² and in the areas of production it is 2000-3000 kg/m² [2]. If we are talking about a multi-level facility, we need to take into consideration the required design load of the ceiling structures. Usually, it is not sufficient for any kind of production processes, so the assembly processes are often taking place here.

In terms of the ability to adapt, the single-floored buildings are considered to be better. The hall facilities are enabling an optimal solution for foundation, dimensions, and shapes. Practically any kind of horizontal expansion and any kind of foundation for the machinery is possible in their case. The equal and sufficient natural lighting coming from the top is also worth mentioning.

Multi-level buildings of traditional shapes are having some significant troubles in terms of expanding such as: a restricted continual area for production, difficulties with proportions changing of particular workshops, restricted and fixed positions of the load-bearing features for roof structures. These problems might be solved by the usage of so-called deep-system multi-leveled facilities. Their maximal depth was estimated somewhere between 18-24m [2] because of the sufficient natural lighting access. Their disadvantage is the lack of natural lighting and high electricity consumption related to that, this problem is, of course, getting better as the lighting technology is evolving (development of energy-efficient lightbulbs).



2.) Basic technological schema

Every facility has its default technological schema, which is planning the storage, transport and production processes in terms of space and time. For example, in terms of material – metallurgical steel, forms – are being stored, being ready-upped and then processed in mechanical workshops. The mechanical workshops are usually being divided into light-processing (processing of light metallurgical steel is taking place here) workshops and heavy-processing workshops (processing of heavy casts is taking place here). If there are any parts made out of metal sheets there are welding and bending workshops added. After the default processing, some parts are being hardened, some of them are being coated or varnished. The smaller parts are then being stored or being transported into the assembly stage from where they come out as a finished product. The finished products are then being tested, packaged, stored and afterward they are exported out of the facility.

3.) Structure of the production

Or also the so-called level of complexity is influencing the design of the facility in terms of the difficulty concerning the composition in particular stages of production.

4.) The capacity of the production

In accordance with the size of the facility, the capacity of production is influencing the dimensioning as well as the number of specialized zones. The default information about technological features is directly being projected into area demand, employees, transport, and energy.



5.) Proportion of areas

We distinguish several types of areas, such as built-up areas, communications and green areas. The average way of the usage of the land for the medium-sized factories is given by the following table.

Type of factory	Built-up area	Communica-tions	Green areas
Electronics	29,7%	19, -%	51,3%
Precision engi-neering	34,3%	21, -%	44,7%
Semi-heavy engineering	32,6%	18,4%	49, -%

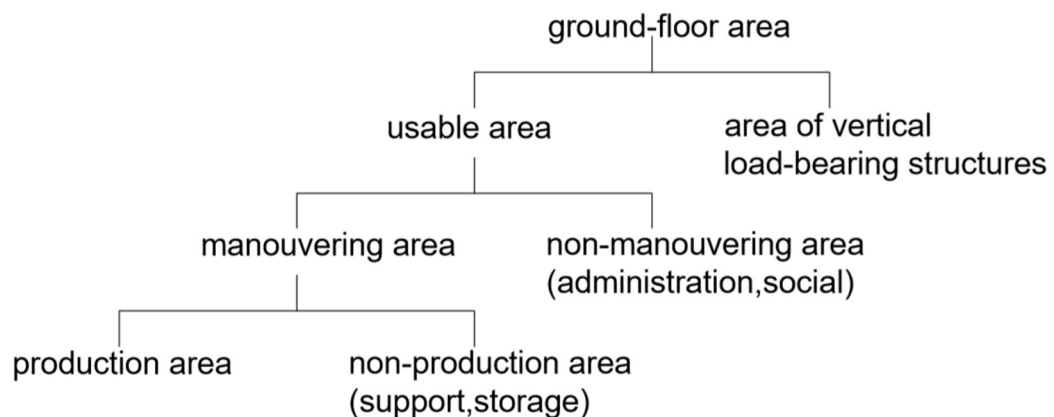
Table 3: Recommended concentration of areas [2]

The recommended concentration for engineering facilities is slightly higher, it is somewhere in between 50-70%. [3] In some foreign countries, they achieved even higher proportions. The ratio between the area of the whole facility and the ground-floor, the area needed for 1m² of ground-floor is influenced by the size of the facility and by the type of buildings used. The average values of required areas and the minimum ranges needed for 1m² of ground-floor are expressed in the table below.

Structural system	Average needed area for 1m ² of GF	Achievable minimum area for 1m ² of GF
Hall buildings	2,6m ²	1,95m ²
Combined poly-block	1,9m ²	1,11m ²
Combined mono-block	1,8m ²	1,06m ²
Multi-leveled buildings	0,54m ²	-

Table 4: Average area needed for 1 m² of ground floor [2]

The proportions of the main functional groups in facilities are quite different in accordance to different fields of engineering. Each of these fields has special needs and requirements in terms of area and space, just in case of storage units we can find some similarities.



Picture 17: Classification of ground floor areas within facility [2]

6.) Proportions of employees

The ratios of employees in facilities are determined basically as in case of areal proportions: by type of production, type of building and the size of the facility.

	Electrical facilities	Precision engineering	Semi-heavy engineering
Workers (production+support)	75,2	77,3	79,9
IT	21,2	19,1	16,5
Supervisors	2,3	2,3	2,3
Non-industrial workers	1,3	1,3	1,3

Table 5: Proportions of workers according to their fields within facility [2]

As we can see in the table, the lowest need for IT labor is in semi-heavy industries where mostly unit production is taking place and more of classical mechanical labor is needed. On the other hand, they are much more needed in the processes with higher automatization, this means electrical production facilities.

In the future, we can expect an increase in the demand for IT workers specialized in the engineering-technical field. The number of workers in accordance with the floor area will continuously decrease due to the increase in mechanization.



4 RISK ASSESSMENT AND MITIGATION PLANS

4.1 RISK ASSESSMENT AND HAZARD MANAGEMENT IN A METAL-PROCESSING PLANT

4.1.1 Introduction

Hazard is a source or situation that has the potential to cause harm in terms of human injury, damage to health, damage to property or the environment. It can be also a combination of these factors. It has got a short or a long-term effect on the work environment with considerable human and economic costs. It has also got a great demoralizing effect on the workforce. A risk can have the potential to create an emergency like the situation at the workplace. The severity of its extent depends on the frequency of exposure to the hazard. Any activity, procedure, plant, process, substance, situation or other circumstances that could have the potential to cause harm constitutes a hazard. Hazards exist in every workplace in different forms and required to be identified, assessed and controlled regarding the work processes, plant or substances. They arise from workplace environment, use of plant and equipment (steel plant processes), the usage of substances and materials, poor work and/or plant design, inappropriate management systems and work procedures and human irresponsible behavior.

Types of hazards include factors as follows: [6]

- a) Physical – These hazards are caused by noise, vibration, lighting, electrical, heat, cold, dust, fire, explosion, moving parts, and workspace, etc.
- b) Ergonomic – These hazards are due to tool design, equipment design, job, and task design, workstation design, and manual handling, etc.
- c) Chemical – These hazards are due to reacting materials, liquids, gases, dust, fumes, and vapors, etc.



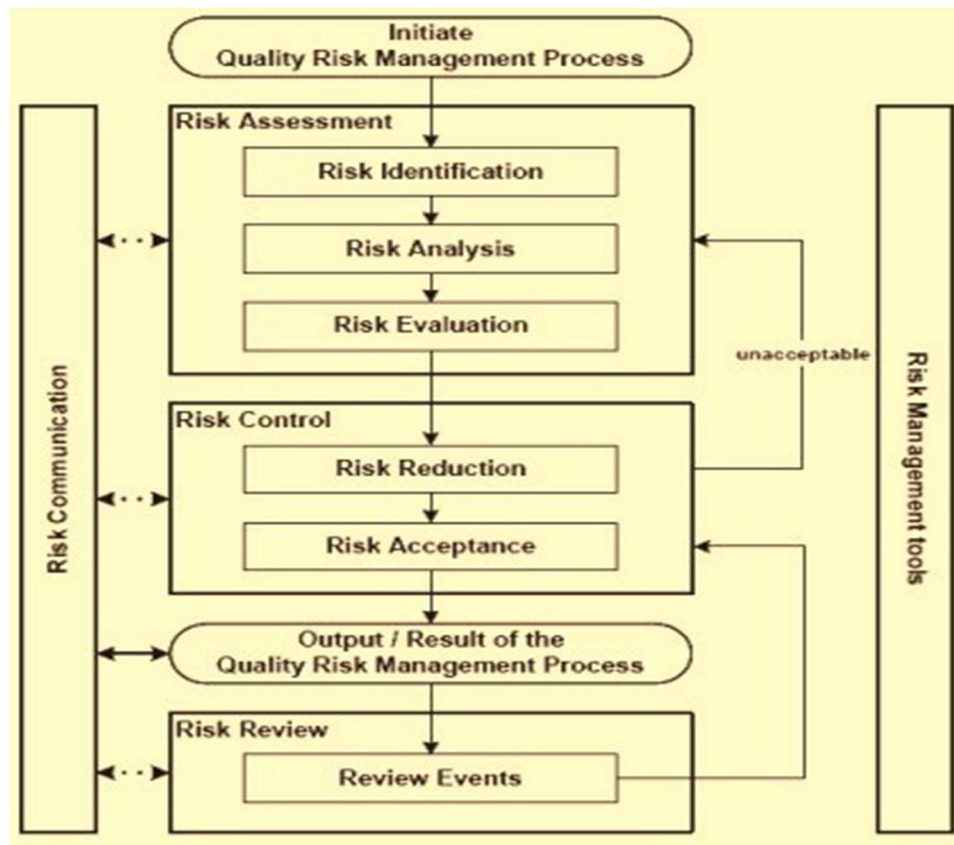
- d) Radiation – These hazards are due to laser (non-ionizing), and X-rays (ionizing), etc.
- e) Psychological – These hazards are due to shift work, workload, harassment, discrimination, bullying, and stress, etc.
- f) Biological – These hazards are due to infections (bacterial and viral) etc.

The hazard identification can be done by direct consultation, observation, review of historical data, research, standards, and audits.

Metal-processing plant has many risk relatable processes and operations which can cause costly environmental, health and safety risks to the workforce. In fact, hazards are present in the steel plant environment at all times. Unlike natural disasters like tornados, hurricanes or tsunami, etc., metal-processing plant hazards are non-avoidable, and hence there exists the concept of so-called “zero tolerance” as a standardized approach for the disaster prevention due to the hazards.

All the hazards cause potential risks to the work environment which include workforce and workplace and therefore they need a need for a proper assessment to be worked out. The assessment is being worked out by probability measurements or the chances and the consequences, assessing the level of risk associated with the hazard, prioritizing, and using tools such as matrix, tie lines, fault tree analysis, failure mode and effect, hazard operability studies, etc.

In general, the metal-processing plants attempt to eliminate or control these risks by the execution of hazard identification and correction, accident prevention, implementation of the safety system, installation of fire protection systems, training and many other measures. On an individual level, risk management is the effort by each component (worker) to make the most of his personal capabilities to eliminate or reduce hazards at his working place. Risk management approaches and principles are being effectively utilized in many areas of the metal-processing plant including finance, occupational safety, insurance with the main focus on the hazards control.



Picture 18: Typical flow chart for risk management [6]

Decision nodes are not shown in the typical flow chart (Picture 21) since decision making can occur at any given point in this process. These decisions might mean that we need to return to the previous step and seek further information, adjust the risk models or even to terminate the risk management process if we have information that supports such a decision.

The metal-processing plants usually use this general six-step process that includes: [8]

- a) Identification of a hazard.
- b) Identification of the associated risk.
- c) Assessment of the risk (the likelihood, the severity, assigning a priority for correction).
- d) Control of the risk (elimination, engineering a barrier, administration controls, personal protection equipment).
- e) Documentation of the process.
- f) Monitoring and review of the process.



4.1.2 Identification of a hazard

This is the part of the process where we are examining the work area and the work to be done in order to identify all the possible hazards that are inherent to the job or the hazards that are present at the job site. A couple of steps can help in the approach for identification of hazards in the work area and the job site: [8]

- a) Walking across the workplace in order to inspect what is in the general area.
- b) Questioning of the employees if they have not noticed anything hazardous.
- c) Reviewing a work instruction or job safety analysis.
- d) Inspecting an operator's manual.
- e) Reviewing previous incident reports.
- f) Looking at a regulatory book (in accordance to the country the facility is built in)

Several examples of hazards that may be found are listed here, as follows: [8]

- a) Unguarded rotating, reciprocating and similar moving parts.
- b) Flammable liquids in the presence of ignition sources.
- c) Unlabeled containers of hazardous chemicals.
- d) Noise with the potential to damage hearing.
- e) Poorly designed tools having the potential to cause injury.
- f) Degraded and worn hand tools.
- g) Waste oil on the floor, that is causing a slipping hazard.



Identification of a hazard in a workplace, control, and assessment are ongoing processes that are best conducted between the employees and management that are in control of the environment. It should be undertaken at various times, as listed: [8]

- a) When stored energy may be encountered (electrical, hydraulic, kinetic, etc.).
- b) Working at heights over four feet.
- c) Working near or inside of a trench or confined space.
- d) On a work zone controlled area.
- e) If the job has never been performed previously.
- f) When a change in the workplace occurs.
- g) After an incident report, regardless of the outcome.
- h) At regular scheduler times appropriate to the workplace.

4.1.3 Identify the risk

When a hazard has been found and identified, the risk which the hazard is associated with must be examined. It is useful to identify all factors that may contribute to the risk, before starting a risk assessment. It is best to do a review of regulations, audits, inspections, previous injuries, and other areas can be used to judge whether the hazard we are observing can actually cause an injury.

		Likelihood					Severity	
	M	M	H	C	C	1		C: Critical
	L	M	M	H	C	2		H: High
	L	M	M	M	H	3		M: Medium
	VL	L	M	M	M	4		L: Low
	VL	VL	L	L	M	5		VL: Very Low
1	2	3	4	5				

Picture 19: The risk matrix [8]



4.1.4 Assess the risk

In terms of assessment of the risk, it is crucial to evaluate the probability that an injury might occur. Therefore, the risk assessments are in general based on two key factors: [8]

- a) The likelihood that the injury (or illness) may actually occur.
(Scale: 1 = rare, 2 = unlikely, 3 = moderate, 4 = likely, 5 = almost certain.)
- b) The severity of the injury (or illness) resulting from the hazard.
(Scale: 1 = may be an injury, 2 = first aid is required, 3 = recordable injury by USA guidelines, 4 = will result in lost time, 5 = fatal.)

There is a pretty simple matrix used to serve as a guide to whether is the risk acceptable or if it needs to be addressed (Picture 21). Remember, not all risk can be eliminated. Usually, urgent action is required for the risks that were assessed as critical or high. These actions may include instructions for immediate interruption of the work process and/or isolation of the hazard until there are permanent measures implemented. As for moderate risks, there are documented control plans with responsibilities and completion dates developed.

4.1.5 Control the risk

In relation to the new control measures and guidelines, new work procedures will need to be developed. In order to have a good plan of actions, the plan needs to include many pieces, such as: [8]

- a) Quick attention to critical or high-risk hazards.
- b) Effective temporary solutions until permanent fixes can be applied.
- c) Long-term solutions to those risks judged to cause long-term illness.
- d) Long-term solutions to those risks with the worst consequences
- e) Arrangement for training workers on the main risks that remain, and they should be controlled.
- f) Regular checks to make sure that control measures remain in place and it is clear who will take what action and by when.

Risk Control Hierarchy		
	Process step	Effectiveness
Clearly state the hazard	1. Eliminate the hazard completely. If the hazard cannot be eliminated, move on to the next step.	100%
	2. Engineer: Create a barrier between the person and the hazard. If this cannot be done, move on to the next step.	70–90%
	3. Administer: Write regulation, law, procedures, etc. If this cannot be done, move on to the next step.	10–50%
	4. Provide personal protective equipment.	20%

Picture 20: Risk control hierarchy [8]

The work at hand can prioritize hazards with the highest potential to cause an injury by assigning a “risk rating” so that they can be eliminated first (Table 9).

4.1.6 Document the process

By documentation of the processes, we help to ensure that the identified risk control measures are implemented in the way they are meant to. It may also assist in managing other risks and hazards that are in some way similar to the ones that were already identified. Adequate record keeping of the risk management processes should serve as evidence that the processes have been conducted properly. This information should include, as follows: [8]

- a) Hazards identified.
- b) Assessment of the risks associated with those hazards.
- c) The decision on control measures to manage exposure to the risks.
- d) How and when the control measures are implemented.
- e) Evidence of monitoring and reviewing the effectiveness of the controls.



4.1.7 Monitor and review

Whichever method of eliminating and/or controlling the hazard is used, it is essential that an evaluation of its impact on the use of the equipment, substance, system, or environment is carried out to ensure that the control does not contribute to the existing hazard or introduce a new hazard. It is also essential that all people involved are informed about the changes and, when necessary, provided with the appropriate information, instruction, training, and supervision to ensure that each worker is safe from injury and risk to health. It is also recommended that after a period of time, the area supervisor carry out a review of the system or control to determine its ongoing suitability. [8]

4.2 MITIGATION PLANS

Mitigation Plans are being formed in order to form the strategy to reduce disaster losses as well as break the cycle of the damage done by disaster, repeated damage and reconstruction. It creates the default framework for decision making at a risk-based situation to reduce damages done to lives, property, and economy from future disasters. The mitigation plan can help the facility managers and all the workers to become more sustainable by identifying proper mitigation actions [7].

The picture below (Picture 21) shows all the risks associated with mitigation measures proposed for the main five risk factors as developed through two case studies. While applying these risk mitigation responses, a follow-up analysis was performed. With risk mitigations applied, it would be expected that the risk scores for the top five risks (and therefore for the projects as a whole) should lower. The expected decrease did occur and, as a result of applying the responses, the risk score decreased from 72,9702 to 66,9258 in the

Rank	Weight	Risk factor
2	4.75	Design faults (errors) and omissions
3	3.75	Poor plant availability and performance
4	3.22	Access to operational records and ownership of developed technologies after completion
5	3.04	Technology spill prevention plan
6	3.02	Ambiguous contract terms (imperfection)
7	3.02	Clarification of criteria on LD (liquidated damages)
8	2.91	Investment costs
9	2.88	Infringement of intellectual property rights by third parties
10	2.79	Revenue (product sales and prices)
11	2.76	Prohibition of license transfer
12	2.7	Conditions for coal, ore, and raw materials

Picture 21: Top 12 risk factors [9]



case of project A and from 70,0003 to 64,4484 in the case of project B. The order and items of the five risk factors also changed, as shown in tables 11

Risk Factor	Response Mitigation Measures
Procurement plan of coal, ore, and raw materials	Understanding the status of available raw materials Review of location and logistics Review of feedstock supply agreement strategy
Design faults (errors) and omissions	Creation of design output checklist Sharing design output by discipline and reinforcement of crosschecks Strengthening communication with local companies
Conditions of coal, ore, and raw materials	Preliminary review and test of locally procured coal, ore, and raw materials
Technology spill prevention plan	Packaging design output and sharing only final output Adjustment of scope of project output at contract
Investment cost	Adjustment of project scope Optimization of equipment and design Localization of equipment and design Estimating the preliminary cost considering fluctuation such as exchange rates
Poor plant availability and performance	Documentation of O&M techniques for existing plant Improvement in availability and performance at the design stage Configuration and application of proven facilities

Picture 22: Response to top risk factors [9]

and 12. Along with planning risk response, this represents the PMBOK (Project Management Body of Knowledge) risk assessment steps of implementing risk responses and monitoring results [9].

After the risk response, in the second risk assessment, the risk score decreased by approximately 8,3 % for project A and by approximately 7,9 %

		1st Risk Assessment 72.9702/100		2nd Risk Assessment (After Response) 66.9258/100		
Risk Rank		Weight	Score		Weight	Score
1	Procurement plan of coal, ore, and raw materials	4.85	4.86	Procurement plan of coal, ore, and raw materials	4.85	2.62
2	Design faults (errors) and omissions	4.75	3.69	Technology spill prevention plan	3.04	2.50
3	Conditions of coal, ore and raw materials	2.70	3.10	Ambiguous contract terms (imperfection)	3.02	2.44
4	Technology spill prevention plan	3.04	2.71	Design faults (errors) and omissions	4.75	2.30
5	Investment cost	2.91	2.58	Clarification of criteria on LD (Liquidated damages)	3.02	2.30

Picture 23: Risk factors after risk response in Project A [9]

for project B. The order and items of the top five risk factors also changed. However, risk factors with high importance remained high even after reassessment. Therefore, risks with high priority should be managed consistently [9].



Risk Score	1st Risk Assessment 70.0003/100			2nd Risk Assessment (After Response) 64.4484/100		
		Weight	Score		Weight	Score
1	Procurement plan of coal, ore, and raw materials	4.85	3.77	Ambiguous contract terms (imperfection)	3.02	2.43
2	Design faults (errors) and omissions	4.75	2.93	Clarification of criteria on LD (Liquidated damages)	3.02	2.33
3	Poor plant availability and performance	3.75	2.69	Financing plan	2.60	2.29
4	Conditions of coal, ore and raw materials	2.70	2.53	Technology spill prevention plan	3.04	2.23
5	Investment cost	2.91	2.48	Design faults (errors) and omissions	4.75	2.02

Picture 24: Risk factors after risk response in Project B [9]

5 PROJECT APPLICATION

In general, we divide objects into several zones, depending on the risk probability. In this particular case, we distinguish 3 types of zones, safe zone, external zone, high-risk zone. As a safe zone, we consider administrative areas, lockers, and rooms with sanitary appliances that are easy to evacuate personal with no life threats. As an external zone, we consider areas with the possibility of risks while the process of evacuation is taking place. As a high-risk zone, we consider the areas with a high probability of life threats. The division is made colorfully on the printed layout drawings.

5.1 ARCHITECTURAL AND DISPOSITIONAL SOLUTION

Hall Steel cord (SC) executed in two stages – Steel cord 1 (SC1) covering approximately 34 500 m² with the production capacity up to 27 000 t / year, which is located right next to the as-built object Bead Wire (built in 1. stage) and a Steel cord 2 (SC2) covering approximately the same area as Steel cord 1 with the production capacity up to 23 000 t / year is planned to be done in the future. This thesis is dealing with the 2. stage construction, particularly of the object SC1. The hall Steel cord 1 is being built in three phases („a“, „b“, „c“). The phase „a“ is composed of production area for plating, final broaching and braiding and reeling. Phase „b“ is going to spread out the ground-floor area towards the as-built hall Bead Wire. Phase „c“ is going to expand the construction done already in the 1. stage, where the expansion of



the production spaces happens along with the growth of technological hinterland which is connected with the operation of the facility.

The designed object is of technological-production character and it is not possible to judge this object in terms of urbanistic and architectural aspects due to its specific technological character. The shape and the dispositional solution are fully satisfying requirements of given technological processes. Hall SO 02.1 is located in the middle part of the facility right next to the already existing hall Bead Wire (BW). It is a single-floored (with double-storied built-in lockers) object of rectangular shape with the dimensions of approximately 105x318 m and with the maximal height of attic 9,8 m. The heights are differing along with the platform. The minimal clear height under the girder is different in accordance with the type of process. The load-bearing construction is created by a multi-shipped concrete and steel skeleton covered by a saddle purlin roof. Perimeter walls are built from thermal insulating sandwich panels in combination with windowsills made out of reinforced concrete that have contact insulation system.

Dispositional arrangement of the hall is fully corresponding with the production flow. There is a double-floored in-built (central lockers) in the north-western corner of the object. The main entrance is located on the ground floor from the western side of the building. The production hall (SO 02.1 – I. Stage) is single-floored. There are single-story in-builts inside the production hall. The in-built at the western facade is used by the workers for incoming and outgoing goods as well as social appliances. The middle in-built (located on the „H“ axis) is going to be used mainly as a technological hinterland with offices for maintenance employees. Other parts of the in-built are used as storage for chemicals, welding room and as a chemical mixing room. The main production spaces are located along the northern and southern facade of the object. In particular, we are talking about spaces where the plating, final broaching and braiding, and reeling. Further, the spaces of control, packaging and final expedition are connected. At the western facade, there are located spaces of acid and lubricant storages. Annex on the northern side is a single-9story and a double-story structure and it includes dust filters for the technology, pumping



station of the underground waters, substations for low voltage, high voltage, transformer station and a free-time room for employees.

Object SO 11 Gas storage is located close by the administration building. It is a simple ground floor construction with the dimensions of 6,0 x 4,40 m and height 3,725 m with a steel load-bearing construction that is anchored in reinforced concrete. The roof structure is made of metal sheeting that is laid on steel beams. The height of the fencing surrounding the object is 2,25 m.

5.2 DESCRIPTION OF PRODUCTION TECHNOLOGY

There was a production of bead wire (BW) installed in the production grounds of Kiswire company during the first stage of construction, which is located in hall SO 01. In the first stage, we were considering just low-volume serial production, with the capacity between 200–2000 tons / year. After the construction of the second stage, installation of production technology SC1 into separate building, the estimated steel cord production capacity is 25 000 tons / year.

production capacity (tons/year)	2016	2017	2018
Bead wire (BW)	200-2000	2000-18000	18000-35000
Steel cord 1 (SC1)	-	-	25 000

Table 6: Growth of production capacity

Transport of material within the hall is provided by fork-lift trucks with the bearing capacity of 2 tons, portal cranes with bearing capacity up to 3,2 tons and channels with movable hoist with the bearing capacity 250 kg. After that, special handcarts for the transport of pallets will be used. The hall is designed in such a way, so the material is transported just within the hall at all times. Only exceptions are the wires for the production of steel cord (SC, hall SO 02), which are being transported to be modified by lead, this process is taking place in the hall for the production of bead wires (BW, SO 01). Transport between the halls is done by fork-lift trucks. Raw materials, supplies, chemicals, and packaging material are supplied by trucks. Products and waste (left-overs) are also being transported by trucks.

On the pre-drawing line, there are two ventilation filters installed in total in order to provide suction the mechanical cleaning of wire, one per three



cleaning heads. The air is supplied back into the hall after it is cleaned. In other cases, it is being deflated outside by chimney in order to maintain an optimal temperature inside the hall.

Furthermore, there are installed two ventilation filters on the pre-drawing line providing suction of dry lubricant in its own process – broaching of the wire, one filter for three broaching heads. The air is supplied back into the hall after it is cleaned. In other cases, it is being deflated outside by chimney in order to maintain an optimal temperature inside the hall.

On the plating line, is a water scrubber installed (or two smaller units serving the same purpose) in order to clean the abduct from acidic and alkaline pickling wells. The abduct in the scrubber is neutralized by alkaline foamy/cloudy filling and cleaned air matter is abducted out from the production object.

5.2.1 The production process of the steel cord

The fundamental element for the production of the steel cord is a cylindrical wire, which is supplied and stored in the storage room for input material. In the first stage of production, the wire goes through pre-drawing. Firstly, the badge of wires is laid onto the un-reeling machine. The wire is roughly cleaned by the set of cleaning heads, the rough surface impurities and corrosion are taken care of by bending of the wire. After that, the wire is mechanically cleaned by grinder with rotation heads. Ground steel dust is being collected by a ventilation filter and supplied back to steelworks as and raw material for steel production. Once the wire is mechanically cleaned, it is washed in cold water wells. The washed wire then proceeds into hot ungreasing wells, where a chemical coating takes place (Borax), for neutralization and improvement of the next process – pre-drawing. Then, the wire is being dried off by hot air while it is entering the pre-drawing process itself. The wire passes through the pre-drawing machine, where with the help of dry lubricant it shrinks in diameter. The dry lubricant is being pulled away and dust is being caught up in ventilation filter. The whole process is being cooled down by the inner circle of cooling water. Thinned out wire is afterward reeled onto coils. Approximately 50 % of wires used for the production of steel cord is not drawn on this line. A



line that is a part of the bead wire production is used for this purpose. The next production process is the process of plating. The coils of wire from the previous stage are being set onto the un-reeling machine and the wire is splashed with hot water which contains a little bit of soap (Borax). Afterward, the wire is heated up in an oven to the temperature of 950 °C and then it passes through a well that is containing lead with the temperature of 450 °C, by which we get rid of the tension that was caused by the previous broaching. Cooling down by the water and acidic wells (H_2SO_4) are following up this process. Then it proceeds to wells with sodium hydroxide (NaOH), where the neutralization of the surface takes place after previous processes. Then, after the splashing by water, comes chemical cleaning – activation in the sulphuric acid wells (H_2SO_4). There occurs a chemical reaction during the chemical cleaning, so it is necessary to cool the well down. To increase effectiveness, an electric current is added into the sulphuric well, that creates a weak electrolyte. Afterward, a plating process takes place in the plating wells, the wells are filled with copper pyrophosphate ($\text{Cu}_2\text{O}_7\text{P}_2\cdot 4\text{H}_2\text{O}$), potassium pyrophosphate ($\text{K}_4\text{P}_2\text{O}_7$), copper sulfate (CuSO_4) and copper scales. In this process, a layer of copper is created on the surface of the wire. Then, after the wire is washed by water it is coated by a layer of zinc in wells containing zinc sulfate (ZnSO_4) and zinc pellets. Later, the wire is washed by water and put into induction oven where it transforms into brass alloy. After finishing the plating process the wire will be once again washed down by the water and dried off by hot air. Following up, in the wells of phosphoric acid (H_3PO_4) the layers of zinc are being removed, because they are undesirable for the process of drawing. Washing down by water and drying by hot air follows next, after that the wire is being reeled up onto a coil. The coils with wire are being transported to the process of final broaching. The wire passes through the broaching machine, where it shrinks in diameter achieving the desired size. A wet lubricant (emulsion Vicafil SL3600) is used for lubrication and cooling down of the wire while it passes through the broaching machine. The emulsion drips down from the machine, so the storage tank for it is located below it. The broached wire is then reeled onto coils. The wires with surface modifications and required diameters are then being braided into bundles by machines. The braided bundles are reeled onto coils of types B40, B60 or B80. Then, the coils are being packaged into paper boxes. There are



40 coils of type B80 per box or 100 coils of B40/60 per box. The boxes with coils are being stored in storage rooms for finished products and dispatched by trucks.

5.3 FIRE SAFETY

5.3.1 Fire safety approach

Object SO 02.3 Central lockers is a two-story object design in accordance with ČSN 73 0802, ČSN 73 0804 and associated norms and regulations. Production and storage part of the object SO 02.3 Hall SC I. stage is a single-story object that is designed according to ČSN 73 0804, ČSN 73 0845 and associated norms and regulations. Objects SO 02.1 and SO 02.3 are statically independent and they are divided by a firewall, which is supported by the construction of SO 02.3. This wall along with the rest of the bearing system of the object SO 02.3 has the fire resistance in correspondence with tab. 12 of ČSN 73 0802, event. According to the tab. 10 of ČSN 73 0804. The required fire resistances are shown in the attached drawings. Objects SO 02.1, SO 02.3 are equipped with the fire alarm system (FA) with CENTRAL STOP and TOTAL STOP buttons, location of these buttons can be seen on the attached situational drawings. On the south side of the object SO 02.1, there are 2 x 2 pcs of containers located (all containers are suitable for flammable substances), to the east of as-built object Bead wire there are 3 x 3 pcs of containers (just one container from the group is suitable for flammable substances). By flammable substances we understand a common flammable substance, there is no storage of flammable liquids, explosive substances, pressure vessels, etc. The containers are designed according to article 11.5 of ČSN 73 0804 as free storages. Fire resistance is not required in this case – there are safe distances designed for free storages, as can be seen in attached drawings.

Hall SO 02 SC

In accordance to article 7.1.7 of ČSN 73 0804, there is no need to precisely describe limits of the ground plan area in the fire segment N1.01 of the object SO 02.1, since the object has a non-flammable load-bearing system,



coefficient $k_7 \leq 3,0$ (in reality $k_7 = 2,0$). There are designed no spaces in accordance to ČSN 65 0201 as well as no garages, this fire segment is classified into the 2. group of production and operation spaces and the segment is equipped with the electronic fire alarm system – **satisfactory – the limiting area is not described.**

The production hall SC is used as an operation for drawing of the wires. The production space is evaluated as a space for wire drawing according to item 2.2, table E.1 of ČSN 73 0804. There is a technological gas boiler room designed in the object SO 02.1. The power output is 1,72 MW – in accordance with article 5.2.4 of ČSN 73 0804, the boiler room has to a separate fire segment. According to article 5.1 b) of ČSN 07 0703 the boiler room is classified as a boiler room of **II. category**. In the boiler room as well as in the hall space (fire segments N1.01 and N1.18) there must be installed a detection of a gas leak with the autonomous shutdown of gaseous fuel in correspondence with ČSN 07 0703. There is a storage tank with ammonia water in room no. 1.55, detection of ammonia is designed there along with forced ventilation. There are small storage rooms located in this fire segment (up to 25 m²). These areas are considered as apart of production space (their fire load is identical to the fire load of the production space) in accordance with article 3.44 of ČSN 73 0804. The transformer stations are evaluated according to ČSN EN 619 36-1. Rooms of the transformer stations must be divided into separate fire segments. Rooms for high and low voltage (substations of HV and LV) are also separate fire segments. There are ventilation and cooling units installed on the roof, which are located outside of a fire danger zones of other fire segments in accordance with ČSN 73 0804, article 5.2.4 d). A storage area that is greater than 600 m² must be considered as a separate fire segment according to article 4.1 c) of ČSN 73 0845 (it is a single-floored object that is simultaneously fulfilling other purposes).

A separate fire segment is created by the spaces that ensure the fire safety of the construction, in particular, it is room no. 1.33b, where the center of FA is located. There is located also a switchboard that supplies fire safety appliances in this room, which is also a separate fire segment – it has designed



fire resistance of EI 30 DP1. The gas regulation station is a separate fire segment and it is evaluated according to ČSN 73 0804 and TPG 605 02, see cap. 4.12. The non-production processes in the object SO 02.1, in the fire segment N1.01, they are composed of social appliances and offices with a total area of 270 m². Evaluation – the area exceeds 600 m² neither 30 % of the ground plan area; according to ČSN 73 0818, there is assumed the number of people in the office's max. $214/5 = 43$ people < 50 people – the requirements of ČSN 73 0804 are **satisfied**. Room no. 1.72a is used for recharging of forklift batteries, there is no need for it to be evaluated as a separate fire segment since the batteries are not taken out from the forklifts.

There is a substation designed on the first floor between the axis 12 - 13a / E-F. In accordance with ČSN 73 0804, this floor is evaluated as a technical floor – there is not even a temporary workplace designed – the object SO 02.1 is solved as a single-floored.

The outer areas are not used for storage – cooling devices and storage tanks for flammable liquids are located here. There are designed safe distances from the cooling devices. These constructions have a fire resistance of DP1. The cooling devices are a part of the N1.01 fire segment. On the south facade, there are two entrances for piping – their entrances are a part of the N1.01 fire segment.

Escape from the object is led along the Emergency Escape Routes (EER).

Dust collector units serve as a tool for suction of the dust. These units are designed and evaluated by an external specialized company and they need to be checked at least once a year.

The ventilation engineering rooms are separate fire segments (besides the ones that are located in a fire segment that they are dedicated to).



Central lockers

There is a gas boiler room designed in this object. The power output of the boilers is 2 x 120 kW – according to article 5.3.2 of ČSN 73 0802 the boiler room must be a separate fire segment. In accordance with article 5.1 a) of ČSN 07 0703 it is a boiler room of **III. category**. There needs to be the detection of gas designed in the boiler room. Escape from the object is led by the Emergency Escape Routes. According to ČSN 73 0802, article 9.6.4 b), there is no need for an emergency elevator because the object has less than three levels.

The spaces under the ceiling, where the electro installation are not evaluated as a separate fire segment in accordance with ČSN 73 0810, article 5.6.3 aa) and ab). Installation shafts are not a separate fire segment neither. The ventilation engineering rooms are separate fire segments (besides the ones that are located in a fire segment that they are dedicated to).

SO 11 Gas storage

The object is solved in accordance with ČSN 73 0804 and ČSN 07 8304. It is evaluated as a separate fire segment. The load-bearing system of the object is non-flammable – types of structures DP1. The load-bearing system of the object is evaluated according to ČSN 73 0804, article 5.7.1.



5.3.2 Technical fire characteristics of used substance

Name	State of aggregation	Volume (l)	Mass (kg)	Ignition point	Boiling point	Explosion area upper/lower	Suitable extinguisher
Borax	solid(crystalline)		1000	-	1575		powder,water,CO2
Vicafil Sumac 3 X (Dry lubricant)	solid		4000	-			dry chemicals,CO2
Sulphuric acid (H ₂ SO ₄ 98%)	liquid	13586,95		-	330		foam
Sodium hydroxide (NaOH 50%)	liquid	1307,19		-	142		non-flammable
Copper anodes (Cu 99,95%)	solid(powder)		6000	-			non-flammable
CopperPyrophosphate (Cu ₂ O 7P ₂ 4H ₂ O)	solid(powder)		400	-			non-flammable
Copper sulfate (CuSO ₄)	solid		800	-			non-flammable
Potassium Pyrophosphate (K ₄ P ₂ O ₇)	solid		1500	-			powder,water,CO2
Zinc Sulphate (ZnSO ₄)	solid		1000	-			non-flammable
Zinc anodes (Zn 99,995%)	solid		3500	-	908		non-flammable
Pyrophosphoric acid (H ₄ P ₂ O ₇)	solid		500	-			non-flammable
Potassium Nitrate (KNO ₃)	solid		500	-	400		powder,CO2
Zircon sand (Zr 98%)	solid		1000	-			non-flammable
Phosphoric acid (H ₃ PO ₄) 75%	liquid	1780,41		-	158		non-flammable
Wet coating lubricant (Vicafil SL3600)	liquid		30000	-			non-flammable
Lead (Pb 99.99%)	solid		4000	-			non-flammable
Anthracite	solid		6000	-			water
Ammonia (NH ₃) - ammonia water 25%	liquid	2222,22			37,7	15,4% / 33,6%	powder,water,CO2,foam

Picture 25: Characteristics of used substances



5.3.3 The division into fire segments

The division into fire segments is done in accordance with ČSN 73 0802 and ČSN 73 0804. The division is as follows:

SO 02.1 – SC:

SO 02.1 N1.01 - production hall	ČSN 73 0804
SO 02.1 N1.02 - storage	ČSN 73 0804 + ČSN 73 084
SO 02.1 N1.03 - the packaging	ČSN 73 0804
SO 02.1 N1.04 - LV substation	ČSN 73 0804
SO 02.1 N1.05 - substation	ČSN 73 0804 + ČSN EN 61936-1
SO 02.1 N1.06 - LV substation	ČSN 73 0804
SO 02.1 N1.07 - boiler room	ČSN 73 0804 + ČSN 07 0703
SO 02.1 N1.08 - LV substation	ČSN 73 0804
SO 02.1 N1.09 - substation	ČSN 73 0804 + ČSN EN 61936-1
SO 02.1 N1.10 - LV substation	ČSN 73 0804
SO 02.1 N1.11 - substation	ČSN 73 0804 + ČSN EN 61936-1
SO 02.1 N1.12 - LV substation	ČSN 73 0804
SO 02.1 N1.13 - central FA	ČSN 73 0804 + ČSN 73 0875
SO 02.1 N1.14 - gas regulation	ČSN 73 0804 + TPG 605 02
SO 02.1 N1.15 - substation	ČSN 73 0804
SO 02.1 N1.16 - storage	ČSN 73 0804 + ČSN 73 0845
SO 02.1 N1.17 - storage	ČSN 73 0804
SO 02.1 N1.18 - production hall	ČSN 73 0804
SO 02.1 N1.20 - LV substation	ČSN 73 0804
SO 02.1 N1.21 - HV substation	ČSN 73 0804
SO 02.1 N1.22 - substation	ČSN 73 0804 + ČSN EN 61936-1
SO 02.1 N1.23 - LV substation	ČSN 73 0804
SO 02.1 N1.24 - storage	ČSN 73 0804

Table 7: Division into fire segments



SO 02.3 – Central lockers:

GF

SO 02.3 N1.21 - canteen	ČSN 73 0802
SO 02.3 N1.22 - corridor	ČSN 73 0802
SO 02.3 N1.23 - corridor	ČSN 73 0802
SO 02.3 N1.24 - workshop	ČSN 73 0804
SO 02.3 N1.25 - laboratory	ČSN 73 0804

Table 8: Division into fire segments (GF)

1.FL

SO 02.3 N2.01 - locker	ČSN 73 0802
SO 02.3 N2.02 - boiler room	ČSN 73 0802 + ČSN 07 0703
SO 02.3 N2.03 - ventilation eng. room	ČSN 73 0802 + ČSN 73 0872
SO 02.3 N2.04 - ventilation eng. room	ČSN 73 0802 + ČSN 73 0872
SO 02.3 N2.05 - locker	ČSN 73 0802
SO 02.3 N2.06 - ventilation eng. room	ČSN 73 0802 + ČSN 73 0872

Table 9: Division into fire segments (1st floor)

Containers:

K1.01 - containers (south)	ČSN 73 0804
K1.02 - containers (south)	ČSN 73 0804
K1.03 - containers BW_1	ČSN 73 0804
K1.04 - containers BW_2	ČSN 73 0804
K1.05 - containers BW_3	ČSN 73 0804

Table 10: Division into fire segments

SO 11 – Gas storage:

SO11 N1.01 – gas storage	ČSN 73 0804 + ČSN 07 8304
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Table 11: Division into fire segments



5.3.4 Classification of the fire resistance level

Classification of the fire resistance level and evaluation of the limiting size of fire areas is done in accordance with 73 0802 and ČSN 73 0804. The fire segments are classified and evaluated in the tables below.

SO 02.1 – SC:

Fire segment	Equivalent duration of fire (t_e)	Level of fire safety	Limiting fire area
SO 02.1 N1.01 - production hall	35,12 min	I.	not specified
SO 02.1 N1.02 - storage	180 min	IV.	satisfactory
SO 02.1 N1.03 - the packaging	180 min	III.	satisfactory
SO 02.1 N1.04 - LV substation	24 min	I.	satisfactory
SO 02.1 N1.05 - substation	14 min	I.	satisfactory
SO 02.1 N1.06 - LV substation	26,9 min	I.	satisfactory
SO 02.1 N1.07 - boiler room	19,39 min	I.	satisfactory
SO 02.1 N1.08 - LV substation	26,78 min	I.	satisfactory
SO 02.1 N1.09 - substation	14 min	I.	satisfactory
SO 02.1 N1.10 - LV substation	21,84 min	I.	satisfactory
SO 02.1 N1.11 - substation	14 min	I.	satisfactory
SO 02.1 N1.12 - LV substation	27 min	I.	satisfactory
SO 02.1 N1.13 - central FA	18,77 min	I.	satisfactory
SO 02.1 N1.14 - gas regulation	120 min	II.	satisfactory
SO 02.1 N1.15 - substation	21 min	I.	satisfactory
SO 02.1 N1.16 - storage	180 min	IV.	satisfactory
SO 02.1 N1.17 - storage	180 min	III.	satisfactory
SO 02.1 N1.18 - production hall	34,19 min	I.	satisfactory
SO 02.1 N1.20 - LV substation	29,88 min	I.	satisfactory
SO 02.1 N1.21 - HV substation	30,55 min	I.	satisfactory
SO 02.1 N1.22 - substation	21 min	I.	satisfactory
SO 02.1 N1.23 - LV substation	30,58 min	I.	satisfactory
SO 02.1 N1.24 - storage	38,5 min	I.	satisfactory

Table 12: Classification and evaluation of fire segments in object SO 02.1

SO 02.3 – Central lockers:**GF**

Fire segment	Equivalent duration of fire (t_e)	Level of fire safety	Limiting fire area
SO 02.3 N1.21 - canteen	-	II.	satisfactory
SO 02.3 N1.22 - corridor	-	I.	satisfactory
SO 02.3 N1.23 - corridor	-	I.	satisfactory
SO 02.3 N1.24 - workshop	66,05 min	II.	satisfactory
SO 02.3 N1.25 - laboratory	49,26 min	II.	satisfactory

*Table 13: Classification and evaluation of the fire segments in object SO 02.3***1.FL**

Fire segment	Equivalent duration of fire (t_e)	Level of fire safety	Limiting fire area
SO 02.3 N2.01 - locker	-	II.	satisfactory
SO 02.3 N2.02 - boiler room	-	II.	satisfactory
SO 02.3 N2.03 - vent. eng. room	-	II.	satisfactory
SO 02.3 N2.04 - vent. eng. room	23,04 min	I.	satisfactory
SO 02.3 N2.05 - locker	-	II.	satisfactory
SO 02.3 N2.06 - vent. eng. room	-	II.	satisfactory

*Table 14: Classification and evaluation of the fire segments in object SO 02.3*Containers:

There is no fire risk assessment in case of free storages. According to article 11.5 of ČSN 73 0804, there is assumed a middle density of heat flow, expressed by the equivalent time of fire 50 minutes. Containers 2x 2 pcs, which are located to the south of hall SC are meant for storage of flammable substances. Containers 3 x 3 pcs, which are located to the east of the object BW are meant for storage of both, flammable and non-flammable substances. Based on the information given by the investor, flammable substances are always stored just in one container. The safety distances are then designed based on this container. The limiting fire area is determined for the biggest fire segment ($S = 75 \text{ m}^2$). The limiting fire area is **satisfactory**.

SO 11 – Gas storage:

According to ČSN 07 8304 article 10.23, the fire risk is not assessed for open storages. Therefore, this fire segment does not have a level of fire resistance. The limiting fire area of this fire segment is **satisfactory**.



5.3.5 Fire intervention

The main fire intervention is supposed to be provided by the fire squad of Ustecko region, fire station Žatec. To calculate the probable time period since the announcement of fire until the beginning of the fire intervention, we used these values: time period needed for the fire squad to arrive, distance = 11 km, $t_j = 60 \cdot L / 45 = 15 \text{ min}$; $t_{DO} = t_y + t_j = 2,00 + 15 = 17 \text{ min}$; time to unreeling $t_{BR} = 4 \text{ min}$; the total time equals 21 min. The driveway is connected to communications in the facility area, which allows access to the solved objects. Escape exits are located evenly along the perimeter of the object. These escape exits are connected to the escape routes inside the objects. Inner intervention routes are not required. The fire intervention inside the object can be led through inner unprotected escape routes. Outer intervention routes are designed with fire ladders to access all roofs. All the objects are equipped with Fire Alarm (FA). The amount of flammable substances is strictly limited, there is just the amount needed for the operation of the production process.

5.4 GAS DETECTION

The purpose of this project documentation is to design a detection system for flammable gasses in the production hall used for the production of steel cord. The gas detection in the new hall is going to have the same solution and by the same producer as the detection in the hall for the production of bead wire so the systems are united. There are 18 flammable gas detecting units installed in the new object. Every Aseko (producer) switchboard is connected to FDAS (Fire Detection and Fire Alarm Systems) and I&C (Instrumentation and Control).

5.4.1 Detection of gas regulation station

Behind the regulation station (hall 1.35) there is a switchboard RDP1 (Remote Desktop Protocol) installed on the back of a wall. In this switchboard is installed Aseko Asin ACU central, which is supplied by the source DPP 60-24-1. There are also switching elements installed in the switchboard for individual outputs, indicator lights and control elements are installed on the doors. A lighting alarm and acoustic annunciator are installed above the RDP1 (Remote Desktop Protocol) switchboard.



There are detectors of natural gas installed under the ceiling of the gas regulation station. In front of the station, there is an emergency button installed as well as lighting sign „GAS LEAK“.

Indicator lights on the frontal panel of the switchboard are going to signalize 1. and 2. stage of a gas leak, operation status of BAP gas valve, failure of the BAP valve, failure of the system and closing of the FDAS.

During a standstill, that means when there is no signal from FDAS, the emergency button is switched off and there is not the 2. stage of gas concentration, the KBAP is closed and the BAP valve is open. After reaching the 2. stage of gas concentration, when the emergency button is switched on or in case of fire (signal from FDAS), the whole circuit of KBAP is interrupted and the BAP valve automatically shuts down.

When the 1. stage of gas concentration is reached, the relevant indicator light is switched on at the frontal panel of the switchboard as well as the lighting sign „GAS LEAK“.

When the 2. stage of gas concentration is reached the relevant indicator light is switched on at the frontal panel of the switchboard, the acoustic annunciator goes off, the lighting sign „GAS LEAK“ is switched on and the BAP valve shuts down.

5.4.2 Detection of gas heaters „SAHARA“

In the hall 1.38, there is an RDP2 switchboard installed on the wall, above the switchboard, there are a lighting alarm and acoustic annunciator installed along with the lighting sign „GAS LEAK“.

There are two gas heaters „Sahara“ installed at the entrance into the hall. There are detectors of flammable gasses installed under the ceiling above the gas heaters, which are connected to the RDP2 switchboard central.

The switchboard RDP2 is signaling only 1. and 2. stage of gas concentration, that means that in case of 1. stage the lighting sign „GAS LEAK“ switches on and during the 2. stage, the lighting sign switches on as well as the acoustic annunciator goes off. There is nothing controlled from the RDP2 switchboard.



5.4.3 Detection of a gas leak in hall 1.35

In hall 1.35, there are 3 RDP switchboards in total, those are RDP3, RDP4, and RDP7. There are gas heaters installed under the ceiling within the whole hall and a detector of flammable gasses is installed above each one of them. The detectors are always connected to the closest RDP switchboard.

There is a lighting sign „GAS LEAK“ and acoustic annunciator installed above every switchboard.

The switchboards RDP are signaling just 1. and 2. stage of gas concentration, that means that in case of 1. stage the lighting sign „GAS LEAK“ switches on and during the 2. stage, the lighting sign switches on as well as the acoustic annunciator goes off. There is nothing controlled from the RDP switchboards.

5.4.4 Detection of a gas leak in the boiler room

In the boiler room 1.57, there is a switchboard RDP5 installed on the wall. Central Aseko Asin ACU is installed in this switchboard which is supplied by the source DPP 60-24-1. Furthermore, there are switching elements installed for individual outputs. There are lighting alarm and acoustic annunciator installed above the switchboard RDP1.

There are always detectors of natural gas installed under the ceiling above the boiler and there are detectors of CO₂ installed on the wall in a 1,5m height above the floor. In front of the boiler room, there is an emergency button and lighting sign „GAS LEAK“ installed.

Indicator lights on the frontal panel of the switchboard are signaling 1. and 2. stage of gas concentration, the operation condition of the gas valve BAP for the boiler room, failures of the gas valve BAP, failure and switch on of central FDAS.

During a standstill, that means when there is no signal from FDAS, the emergency button is switched off and there is not the 2. stage of gas concentration, the KBAP is closed and the BAP valve of the boiler room is open. After reaching the 2. stage of gas concentration, when the emergency button is



switched on or in case of fire (signal from FDAS), the whole circuit of KBAP is interrupted and the BAP valve of the boiler room automatically shuts down.

When the 1. stage of gas concentration is reached, the relevant indicator light is switched on at the frontal panel of the switchboard as well as the lighting sign „GAS LEAK“.

When the 2. stage of gas concentration is reached the relevant indicator light is switched on at the frontal panel of the switchboard, the acoustic annunciator goes off, the lighting sign „GAS LEAK“ is switched on and the BAP valve of the boiler room shuts down.

5.4.5 Detection of ammonia

In the room for preparation and storage of chemicals, r.n. 1.55, there is also ammonium water stored. There are detectors for ammonia gas installed under the ceiling. These detectors are connected to the switchboard RDP19 installed on the nearby wall, next to the storage tanks. Right around the corner, on the hall, there are light alarm and acoustic annunciator installed as well as lighting sign „AMMONIA LEAK“.

The switchboard RDP19 is signaling only 1. and 2. stage of gas concentration, that means that in case of 1. stage the lighting sign „AMMONIA LEAK“ switches on and during the 2. stage, the lighting sign switches on as well as the acoustic annunciator goes off.

The central ammonia detection is divided accordingly:

1.stage detection – 20 ppm

- Acoustic and optical signalization
- Signalization towards the place of operation (technological workplace)

2.stage detection – 500ppm

- Acoustic and optical signalization
- Signalization towards the place of operation (technological workplace)
- Switching on of the emergency ventilation (emergency ventilation is connected to the FDAS system)



System of ammonia detection is reporting everything to the FDAS system.

5.4.6 Detection of a gas leak in hall 1.33A

There is a switchboard RDP 8 installed in the hall 1.33A. There are gas heaters installed under the ceiling along the whole hall and there is always a detector of flammable gases installed. The detectors are always connected to the RDP8 switchboard.

There are a lighting alarm and acoustic annunciator as well as lighting sign „GAS LEAK“ installed above the switchboard.

The switchboards RDP are signaling just 1. and 2. stage of gas concentration, that means that in case of 1. stage the lighting sign „GAS LEAK“ switches on and during the 2. stage, the lighting sign switches on as well as the acoustic annunciator goes off. There is nothing controlled from the RDP switchboards.

5.4.7 Detection of a gas leak in hall 1.72

In hall 1.72 are 4 RDP switchboards installed in total, RDP11, RDP12, RDP13, and RDP4. There are gas heaters installed under the ceiling along the whole hall and there is always a detector of flammable gases installed above them. The detectors are always connected to the closest RDP switchboard which is located within the hall.

There are a lighting alarm and acoustic annunciator as well as lighting sign „GAS LEAK“ installed above the switchboard.

The switchboards RDP are signaling just 1. and 2. stage of gas concentration, that means that in case of 1. stage the lighting sign „GAS LEAK“ switches on and during the 2. stage, the lighting sign switches on as well as the acoustic annunciator goes off. There is nothing controlled from the RDP switchboards.

5.4.8 Detection of a gas leak in the boiler room in lockers

In the 2. floor of the in-built of the hall, an RDP9 switchboard is installed in the boiler room 2.14. Central Aseko Asin ACU is installed in this switchboard



which is supplied by the source DPP 60-24-1. Furthermore, there are switching elements installed for individual outputs. There are lighting alarm and acoustic annunciator installed above the switchboard RDP9.

There are always detectors of natural gas installed under the ceiling above the boiler and there are detectors of CO₂ installed on the wall in a 1,5m height above the floor. In front of the boiler room, there is an emergency button and lighting sign „GAS LEAK“ installed.

Indicator lights on the frontal panel of the switchboard are signaling 1. and 2. stage of gas concentration, the operation state of the gas valve BAP for the boiler room, failures of the gas valve BAP, failure and switch on of central FDAS.

During a standstill, that means when there is no signal from FDAS, the emergency button is switched off and there is not the 2. stage of gas concentration, the KBAP is closed and the BAP valve of the boiler room is open. After reaching the 2. stage of gas concentration, when the emergency button is switched on or in case of fire (signal from FDAS), the whole circuit of KBAP is interrupted and the BAP valve of the boiler room automatically shuts down.

When the 1. stage of gas concentration is reached, the relevant indicator light is switched on at the frontal panel of the switchboard as well as the lighting sign „GAS LEAK“.

When the 2. stage of gas concentration is reached the relevant indicator light is switched on at the frontal panel of the switchboard, the acoustic annunciator goes off, the lighting sign „GAS LEAK“ is switched on and the BAP valve of the boiler room shuts down.

5.4.9 Power supply

The power supply of RDP switchboards is provided by the contractor of heavy current.

5.5 ELECTRICAL INTERIOR-HEAVY CURRENT

This part deals with the electricity in the production hall SO 02 (Steel Cord), part of heavy current. As a 2. stage of construction of this object, the



construction of object SO 02 comes with the construction of three transformer stations TS2, TS3, and TS4. The construction of object SO 02 was divided into two separate stages due to the needs of construction. In the first stage of the Steel Cord construction, the middle part of the object SO 02 was designed for installation of the following technologies: plating, final drawing, cabling and twisting, and braiding. The transformer stations TS3 and TS4 were also part of this first stage. In the second stage of the construction of SC, there was the transformer station TS2 and pre-drawing technology implemented. The transformer station TS2 is supplying the pre-drawing technology in this case.

5.5.1 Electric power supply

New transformer stations designed in the object SO 02, labeled TS2, TS3, and TS4 are connected by HV (high voltage) connecting cables from the new switchgear station 22kV which is connected to superior HV switchboard R-22. This part deals with the preparation of the cable route for the HV cables which are located along the H axis towards the transformer stations TS2, TS3, and TS4. A back-up connection of HV switchboards between R22-TS3 and R22-TS4 within the object SO 02 is dealt with during the first stage of construction. The transformer stations TS3 and TS4 are operated autonomously in a standard regime, each one of them is supplied by individual ray cable of HV from the switchboard R22-2 with a back-up connection between TS3 and TS4. The transformer station TS2 is connected during the second stage of construction by ray cable of HV from the switchboard R22-2 without the possibility of back-up connection.

5.5.2 Protective zones

Protective zone of cable routes is located under the ground 22 kV (HV) and 0,4 kV (LW) – 1 m from each side of outer conductors.



5.5.3 Safety ensurance

Protection against injury by electric current – safety precautions:

It is the combination of precautions to ensure the fundamental protection (protection against the touch of live parts) and independently, pre-cautions for ensurance of fundamental protection when a failure occurs.

Considering appliances up to 1000 V – AC (alternative current) –must be in correspondence with ČSN (assumed 332000-4-41, ed. 2)

Combination of pre-cautions for ensurance of fundamental protection (protection against dangerous touching of live parts – protection of live parts of insulation, protection by covers) and independently pre-cautions for protection in case of failure (automatic disconnection from the source in case of failure and grounding).

Considering appliances above 1000 V – AC (alternative current) – must be in correspondence with ČSN (assumed 332000-4-41, ed. 2; ČSN 333201 – electronic installations above AC 1 kV, chapter 7; we can also use the protection by covers to prevent the danger caused by touching of live parts; for non-live parts there is protection by automatic disconnection from the source).

5.5.4 Type of grounding system

Mutual working as well as protection grounding system for the appliances above 1000 V (AC – alternative current) is connected along with grounding of the lightning conductor.

Assumed resistance of grounding system $R \leq 2\Omega$.

Labeled	Description	Type of grounding
SO 02	Production hall	1+3+5
Notes:		
1 - bar net made out of FeZn strips covered by foundation concrete		
3 - FeZn strip welded to reinforced concrete pilot		
5 - connection to the strip grounder that is played along the trenches of other cables of HV and LW		

Table 15: Grounding system



5.5.5 Protection against thermal effects, excess currents, failure currents

The electric installations, distribution lines, and appliances must be in such order that there is no chance of ignition of the flammable materials due to high temperatures. The protection against excess currents and failure currents is ensured by securing devices such as safeguards, by the actual norms of ČSN 33 2000.

5.5.6 Emergency shutdown

In cases of danger, an emergency shutdown device needs to be installed. This device must be easily seen, and it must be possible to operate is fast. The shutdown emergency button can be demanded in these cases:

- At some machinery of production technology
- At technological kitchen appliances
- At transfer stations

5.5.7 Protection against lightning and excess voltage

Outer protection against lightning – is designed by ČSN 62305-1 up to 62305-4.

Inner protection system against lightning – there is coordinated inner protection against lightning as well as against excess voltage by the usage of protection devices in the power parts of networks HV and LW.

For outer and inner protection system against lightning – in order to lower the risk level of damages to the so-called „tolerable risk“ level, there is assessed so-called „lightning protection level“ (LPL) and the class of protection against lightning (outer LPS), inner LPS is assessed as well.

Outer LPS – protection system against lightning (lightning protection system) for outer protection against lightning
Inner LPS – protection system against lightning, designs the dimensions of conductors depending on the electric current of lightning
LPL – lightning protection level – number referring to parameters to particular lightning current and probability of exceeding the min and max values of lightning current

Table 16: Explanation of terms



The lightning conductor is designed as a passive one with a bar system with the openings of 15x15mm with intake wire AlMgSi $\varnothing 8$ mm, with additional intake rods.

5.6 PRECAUTIONS IN CASE OF FIRE

Electric installations must respect the requirements given by the fire safety engineering (FSE) of the construction, including the requirements for shutting down parts of the installation in case of fire. On the other hand, the shutting down must prevent the possible creation of the undesirable condition of the technology.

We assume that buttons Total Stop (TS) and Central Stop (CS) are located in accordance with FSE, in the place of fire department arrival – guardhouse.

The CS button is supposed to shut down electro installation, which is not necessary for the interference of the fire department. In this particular case of object SO 02, when the button CS is activated it shuts down HV field along with the main safeguards of the main switchboards.

The TS button is supposed to shut down the entire electro installation, which is not necessary for the fire department interference. In this case, by activating the TS button we shut down the fire switchboard RPO-02 and emergency lighting.

The functionality class of the Central and Total stop buttons is P30-R (30 min).

5.6.1 Level of fire signalization

The alarm is set by an automatic reaction of FA device. The signalization consists of two levels. The crew at the guardhouse needs to confirm the activation of FA alarm during time period T1. After this step was done, time period T2 starts, during this time period the crew needs to verify if the alarm is real or fake. By confirmation that the message is real, the crew turns on the signalization of general alarm. The time periods are set to $T1 = 60$ s,



$T_2 = 360$ s. When the system is activated, employees must follow the internal guidelines.

5.6.2 Configuration of the FA regime

First stage – time period T_1 is for confirmation that the signal was received by the crew. After the confirmation by the crew, there comes time period T_2 immediately. If the time period T_1 passes by without confirmation by the crew, automatically the general alarm is set off.

Second stage – time period T_2 is meant to give the opportunity to reveal if the alarm was not fake. After the time period, T_2 passes by if it is not stopped by the crew a general alarm is set off. Direct general fire alarm (without the T_1 and T_2 time periods) can be activated by the FA buttons.

5.6.3 The operational crew of the FA

The operational crew on the FA central is secured at the guardhouse (at least 2 people). The operation of the system is secured by people that fulfill the requirements of ČSN 730875 article 14 with regard to the required number of people.

5.6.4 The scenario of FA operation in case of fire

In case of fire the operation crew is supposed to proceed as follows:

- In time period $T_1 = 60$ s the crew worker confirms that the message was received
- In time period $T_2 = 360$ s the crew worker is supposed to find the cause of the alarm
- In case of a fake message the crew worker must cancel the message at the central of the FA
- In case of fire, the crew operates as is ordered by fire regulations and guidelines
- The crew informs the fire intervention squad about the situation



5.6.5 Response strategy to fire alarm

Notification of the fire alarm outside the objects

The operation crew of FA is communicating with the fire squad via cell phone or fixed line.

Notification of the fire alarm inside the objects

The fire alarm within the object is notified by the acoustic system, which consists of designed acoustic annunciators. These annunciators have a minimal volume level of 85 dB 5 dB above the surrounding noise in all parts of the object. The annunciators are switched on immediately after two of the fire detectors go off, when the general alarm goes off or when the alarm button is used. The FA fire resistance routes have functional integrity min. 15 minutes.

5.6.6 Fire detection

For the fire detection and protection of designed spaces, there are automatic and manual fire detectors, which are as follows: - automatic smoke detector – the alarm is set off by detection of smoke or fumes that are related to fire. – automatic thermal detector – the alarm is set off by detection of rising temperature above the limit or if the heat rises too quickly (thermo-differential).

The automatic FA detectors are located in all fire segments of the object, including soffits (except the spaces without fire risk). By a space, without fire risk, we mean toilets, showers, and object for pumping of wastewater. Lockers are considered as spaces with a fire risk. In the substation room, there are point optical-smoke detectors. The detectors cannot be installed directly above the substation, neither close by. The detectors are installed max 0,5 m from doors (minimum distance between the detector and wall). Maintenance is provided by personnel with qualification to enter the substation rooms.

The manual (button) detectors are signaling the alarm on a mechanical basis – press of a button. The manual detectors are located as follows: at all emergency escape exits and along all emergency exit routes at staircases. Then, according to drawings (1. FL), there is a couple of them located at the edges of fire segments. The detectors are located so they are easily accessible.



Input-output devices are signaling the condition of the alarm or failures by operational panel they transmit visual and acoustic information. There is a 24 V supply into kopplers from assistant FA sources.

Assistant back-up 24 V fire sources – are used to supply input-output devices of FA and connecting appliances.

5.7 EVACUATION PLAN

Evacuation of personnel and emergency escape routes are designed according to ČSN 73 0802, ČSN 73 0804, and Regulation no. 23/2008 Sb.

5.7.1 Personnel occupancy

The emergency escape is led along unprotected escape routes. The amount of people working in objects SO 02.1 and SO 02.3 is assumed from the information to give by the investor and then modified in accordance with ČSN 73 0818. Operation of the facility is designed in three work shifts, personnel is changing at the workplaces, evacuation is designed for two work shifts. The objects are evaluated for maximum occupancy by personnel.

SO 02.1 – Hall SC 1. stage

SO 02.1 N1.01 – production hall

SO 02.1 N1.18 – production hall 2

- According to the information from an investor, in two shifts there is max. $70 \times 2 + 15 = 155$ people, in accordance with ČSN 73 0818 we use a coefficient - $155 \times 1,3 = \mathbf{202 \text{ people}}$
- Office spaces in the object have $S = 204,3 \text{ m}^2$ so according to ČSN 73 0818 – $204,3 / 5 = \mathbf{41 \text{ people}}$
- In the fire segments N1.04 – N1.12, N1.16 – N.24 there are no workplaces designed so we assume $E \times s = \mathbf{10 \text{ people}}$ for all of them together
- In total, the amount of personnel in this object is $202 + 41 + 10 = \mathbf{253 \text{ people (this amount stands for the full production capacity)}}$

SO 02.1 N1.02 – storage



- According to the information from an investor, there is max. of 10 people in two work shifts. In accordance with the ČSN 73 0818 – $10 \times 1,3 = 13$ people
- Office spaces have the area $S = 30,2 \text{ m}^2$ – $30,2 / 5 = 6$ people
- In total there is $13 + 6 = \mathbf{19 \text{ people}}$ in the N1.02 fire segment

SO 02.1 N1.03 – the packaging

- According to the information from an investor, there is max. of 10 people. In accordance with ČSN 73 0818 – $10 \times 1,3 = 13$ people
- In total there are **13 people** in the N1.03 fire segment

SO 02.1 N1.04 – LV substation

SO 02.1 N1.05 – substation

SO 02.1 N1.06 – LV substation

SO 02.1 N1.07 – Boiler room

SO 02.1 N1.08 – LV substation

SO 02.1 N1.09 – substation

SO 02.1 N1.10 – LV substation

SO 02.1 N1.11 – substation

SO 02.1 N1.12 – LV substation

SO 02.1 N1.15 – substation

- In these fire segments, there are no workplaces designed so there is assumed to be $E \times s = \mathbf{10 \text{ people}}$. The evacuation is led through the fire segment N1.01 – the personnel is included into this fire segment.

SO 02.1 N1.20 – LV substation

SO 02.1 N1.21 – LV substation

SO 02.1 N1.23 – LV substation

SO 02.1 N1.24 – substation



- In these fire segments, there are no workplaces designed so there is assumed to be $E \times s = 10$ people. The evacuation is led through the fire segment N1.18 – the personnel is included into this fire segment.

SO 02.1 N1.13 – FA central

SO 02.1 N1.14 – gas regulation station

SO 02.1 N1.16 – storage

SO 02.1 N1.17 – storage

- In these fire segments, there are no workplaces designed so there is assumed to be $E \times s = \mathbf{10 \text{ people}}$.

SO 02.3 – Central lockers

SO 02.3 N1.21 – canteen

- According to ČSN 73 0818, there is considered to be $132 / 1,4 = \mathbf{94 \text{ people}}$. In the kitchen, there is considered to be $8 \times 1,3 = \mathbf{10 \text{ people}}$ in accordance with ČSN 73 0818. In total it is considered to be $94 + 8 = \mathbf{102 \text{ people}}$ in this fire segment.

SO 02.3 N1.24 – workshop

- According to information from investor and ČSN 73 0818 – $10 \times 1,5 = \mathbf{15 \text{ people}}$.

SO 02.3 N1.25 – laboratory

- According to information from investor and ČSN 73 0818 – $14 \times 1,5 = \mathbf{21 \text{ people}}$.

SO 02.3 N2.01 – lockers

SO 02.3 N2.05 – lockers

- Part of this room is also used by personnel from BW hall. According to information from investor and ČSN 73 0818 – $30 \times 1,35 = \mathbf{41 \text{ people}}$. (Personnel of BW)
- According to information from investor and ČSN 73 0818 – $85 \times 1,35 = \mathbf{115 \text{ people}}$. (Personnel of SO 02.1)



- In total, there is considered to be $41 + 115 = 156$ people. In the fire segment N2.01 there are 140 people and in fire segment, N2.05 is 16 people.

SO 02.3 N2.02 – boiler room

SO 02.3 N2.03 – ventilation engineering room

- In these fire segments, there are no workplaces designed so there is assumed to be $E \times s = 10$ people.

SO 02.3 N2.04 – ventilation engineering room

SO 02.3 N2.06 – ventilation engineering room

- In these fire segments, there are no workplaces designed so there is assumed to be $E \times s = 10$ people.

SO 011 N1.01 – gas storage

- In these fire segments, there are no workplaces designed so there is assumed to be $E \times s = 10$ people.

The evacuation of all objects was evaluated, and it was declared as **satisfactory** ($t_e \geq t_u \leq t_{u, \max}$). All the escape exits have a width of 0,9m or more and the area of separate rooms is less than 40 m².



5.8 DESIGN OF EMERGENCY ESCAPE ROUTES (EER)

The emergency escape routes must be free to use at all times, this means that there cannot be any material or equipment that could encroach the escape of personnel.

5.8.1 Design of doors along the EER

The doors that are installed along the EER must be in accordance with ČSN 73 0802 and ČSN 73 0804 as follows:

- Doors that are on the EER have to open in the direction of the escape, except doors at which begins the unprotected escape route. - **satisfactory**
- In the production object, there cannot be doorsill installed. This kind of doors are not designed in this object. – **satisfactory**
- Doors that are located in the sidewall of the EER, which are opening into the EER, have to open in the same direction that the people are moving in. Open wing of these doors cannot encroach in the movement of people. – **satisfactory**
- Doors that are opened to the free area, in newly designed objects do not have to be located in the direction of the escape because there are less than 200 people escaping from the object. -**satisfactory**
- Doors that are opened to the staircase area, have to open just till landing of the staircase (cannot be opened till the flight of staircase). The landing must be wide enough so that the EER is not narrowed down when the door is opened. - **satisfactory**

According to article 13.1.1 of ČSN 73 0810, all lockable doors, gates, fire seals, etc. that are located along the EER, must have a steel forging in the direction of the escape. In case of alarm (or other danger), this enables that they can be opened by hand (without the usage of any keys or other equipment and it will not slow down the evacuation), even if they are locked or blocked. The doors are equipped with a panic handle.



5.8.2 Design of staircases along the EER

According to ČSN 73 0802, article 9.14.1, the staircases that are located along the emergency escape routes must fulfill conditions of ČSN 73 4130. The staircases are designed in this regard. – **satisfactory**

5.8.3 Indication of the EER

The emergency escape routes must have distinctly indicated the direction of escape everywhere, where the exit to a free area cannot be directly seen (according to ČSN 73 0802, ČSN 73 0804 and ČSN EN ISO 7010). The EER must be equipped with safety signs in order to make the evacuation easier and quicker. These safety signs are located especially in places where the direction of escape is changing. In the production hall, the EER must be highlighted on the floor. Leaving any material or equipment in this highlighted area is strictly forbidden.

5.9 DESIGN OF THE SAFETY DISTANCES

The design of safety distances, which are defining the fire danger zone is done in accordance with ČSN 73 0802, ČSN 73 0804 and ČSN EN 1991-1-2. The safety distances are not specified for the roof structure of SO 02.1 and SO 02.3 because the structure is fire resistant (see drawings of Fire safety).

The perimeter walls are made from panels with mineral insulation that have A1 or A2 class of fire resistance.

In case of storage rooms, the safety distances are at least 10 meters (according to ČSN 73 0804, article 5.2.4 d)).

The designed safety distances are seen on the attached drawing (part of Fire safety design).

5.9.1 Evaluation of the safety distances

The safety distances are not exceeding the land of the investor. The object is currently not located in a fire danger zone of other objects, except the perimeter wall of the fire segment N1.20, which is located in the fire danger zone of the fire segment N1.01. The wall has a required fire resistance which is in accordance with ČSN 73 0804 – **satisfactory**.



The safety distances of the containers are not exceeding the land of the investor – **satisfactory**.

According to ČSN 73 0804, there is not given any particular safety distance from the storage of pressure vessels. No residential objects, public objects or civil defense shelters are close by – **satisfactory**.



LIST OF PICTURES

Picture 1: Metal-processing facility in Ostravsko region from the first half of the 19th century [3].....	1
Picture 2: Steel-production factory in Vítkovice in 1870 [3].....	3
Picture 3: Steel-production factory in Vítkovice after year 1920 [3].....	4
Picture 4: The common type of lockers before year 1945 [3].....	6
Picture 5: Lockers after year 1945 [3].....	6
Picture 6: Industrial area of paper-production factory (an example of complicated urbanistic concept).....	7
Picture 7: Production conditions, work environment and construction as a united object [1].....	11
Picture 8: Production flow in a bakery: chemical and mechanical processes are continuously taking place in technological devices within separate floors [1].....	11
Picture 9: Semi-heavy production engineering building [1].....	13
Picture 10: Dispositional solution of ships [1].....	14
Picture 11: Transport of products from production ships into collecting ones by console cranes [1].....	15
Picture 12: Height conditions in collecting ships [1].....	17
Picture 13: Influence of distribution canals on the dispositional solution of the ship [1].....	18
Picture 14: Location of distribution networks under roof structure [1].....	19
Picture 15: Storage within the production areas [1].....	20
Picture 16: Location of a mid-sized facility. It is strategically situated in terms of the incoming employees and cargo transport [2].....	22
Picture 17: Classification of ground floor areas within facility [2].....	26
Picture 18: Typical flow chart for risk management [6].....	29



Picture 19: The risk matrix [8].....	31
Picture 20: Risk control hierarchy [8].....	33
Picture 21: Top 12 risk factors [9].....	34
Picture 22: Response to top risk factors [9].....	35
Picture 23: Risk factors after risk response in Project A [9].....	35
Picture 24: Risk factors after risk response in Project B [9].....	36
Picture 25: Characteristics of used substances.....	45



LIST OF TABLES

Table 1: Development of factories [3].....	2
Table 2: Main types of industrial facilities [2].....	20
Table 3: Recommended concentration of areas [2].....	25
Table 4: Average area needed for 1m ² of ground floor [2].....	25
Table 5: Proportions of workers according to their fields within facility [2]..	26
Table 6: Growth of production capacity.....	38
Table 7: Division into fire segments.....	46
Table 8: Division into fire segments (GF).....	47
Table 9: Division into fire segments (1st floor).....	47
Table 10: Division into fire segments.....	47
Table 11: Division into fire segments.....	47
Table 12: Classification and evaluation of the fire segments in the object SO 02.1.....	48
Table 13: Classification and evaluation of the fire segments in the object SO 02.3.....	49
Table 14: Classification and evaluation of the fire segments in the object SO 02.3.....	49
Table 15: Grounding system.....	57
Table 16: Explanation of terms.....	58

Conclusion

In the first part of this thesis, I did research on the history of industrial areas in Czechia. I proceeded chronologically as the design of the areas was developing. I covered all the aspects from the amount of particular production until the design of an appropriate work environment for personnel. Further, I did research on the dispositional design of production industrial areas followed by general risk assessment methods and mitigation measures. In terms of the project application, I implemented ideas of dispositional design as well as technological process and safety precautions by studying the drawings of a project that is built in Czechia. I covered mainly the topic of fire safety and emergency evacuation plan from the building in case of danger.

Goals of this bachelor thesis were fulfilled.

CZECH TECHNICAL UNIVERSITY

Faculty of Civil Engineering
Department of Construction Technology



Bachelor thesis

A MULTILEVEL APPROACH TO MEASURING OF INDUSTRIAL AREAS DUE
TO THE RISK OF FAILURE IN TECHNOLOGICAL PROCESSES

Attachments

Martin Zigo

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CZECH TECHNICAL UNIVERSITY IN PRAGUE

Faculty of Civil Engineering

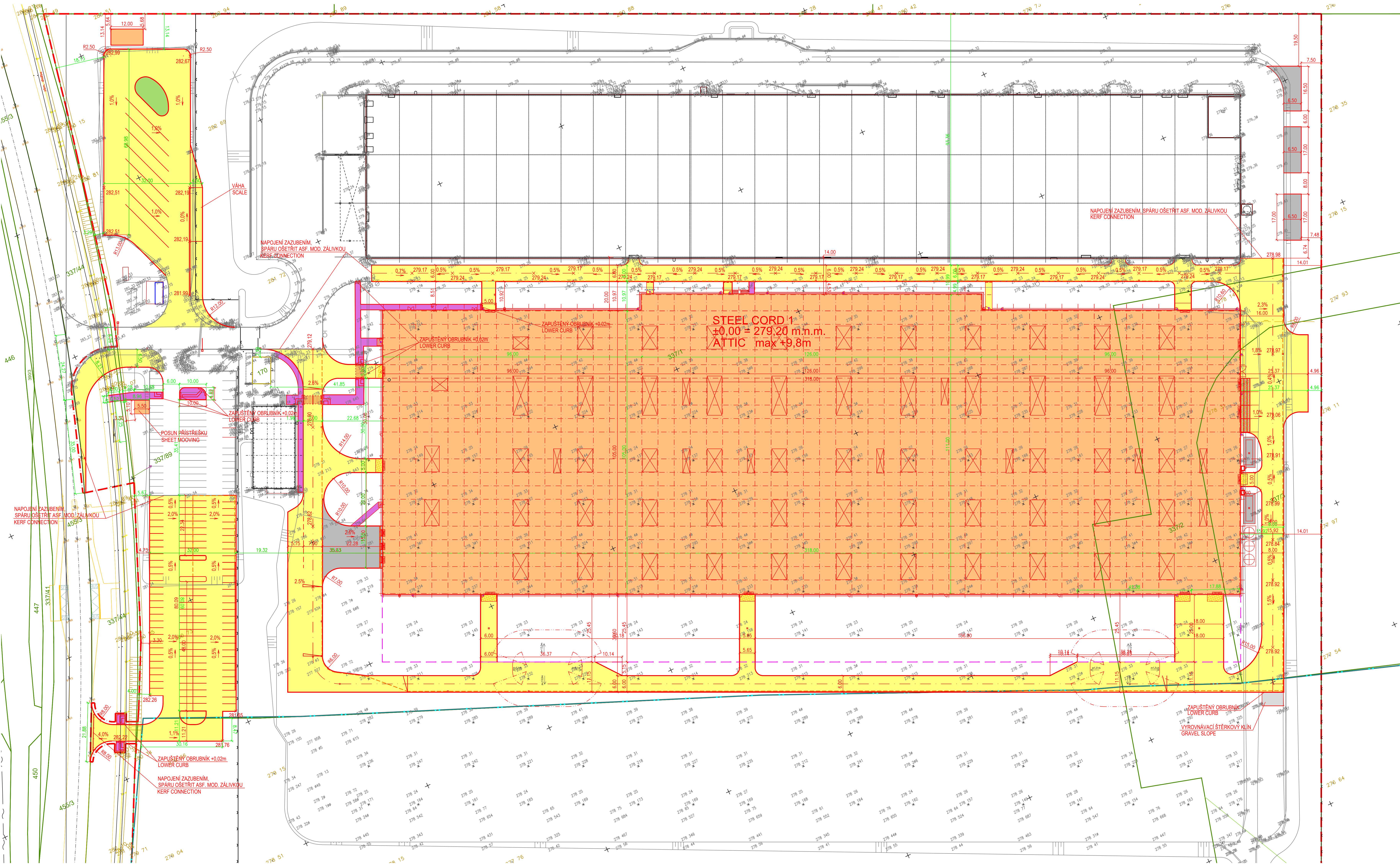
Department of Construction Technology

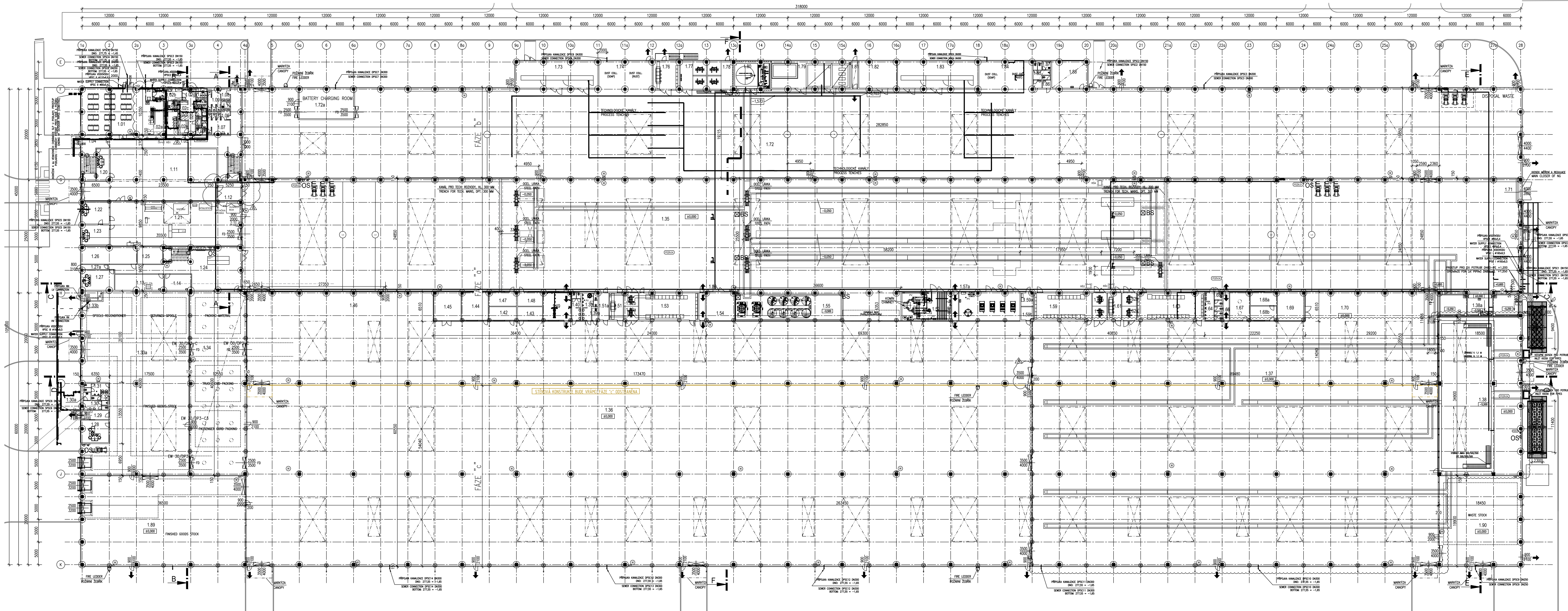
Attachment no.	Name	Scale
No.1	Site layout	1:600
No.2	Ground floor-civil	1:250
No.3	First floor-civil	1:250
No.4	Technological layout	1:250
No.5	Fire safety - layout	1:600
No.6	Fire safety - floor plans	1:250
No.7	Gas detection - ground floor	1:250
No.8	Gas detection - first floor	1:50
No.9	Electrical interior-GF	1:250
No.10	Electrical interior-1.FL	1:250
No.11	Fire alarm - ground floor	1:250
No.12	Fire alarm - first floor	1:250

SITE LAYOUT 1:600

- LEGENDA / LEGEND
- ASFALTOVÁ KOMUNIKACE
ROAD WITH ASPHALT SURFACE
 - BETONOVÁ PLOCHA
AREA WITH CONCRETE SURFACE
 - STĚRK
GRAVEL
 - BUDOVY
BUILDINGS
 - ZASTŘEŠENÉ PLOCHY
COVERAGE AREA
 - CHODNÍKY
PAVEMENT
- CÍZÍ PROJEKT / DIFFERENT PROJECT

- OBJEKTOVÁ SOUSTAVA / LIST OF OBJECTS :
- STAVEBNÍ OBJEKTY / BUILDING OBJECTS
- SO 01 HALA BW / BEAD WIRE
 - SO 02 HALA SC / STEEL CORD
 - SO 02.1A HALA SC I. ETAPA - 1 FÁZE / SC PHASE I - PART 1
 - SO 02.1B HALA SC I. ETAPA - 2 FÁZE / SC PHASE I - PART 2
 - SO 02.1C HALA SC I. ETAPA - 3 FÁZE / SC PHASE I - PART 3
 - SO 02.3 Hala SC - Centrální šatny / Central Lockers
 - SO 03 ADMINISTRATIVNÍ BUDOVA / OFFICE BUILDING
 - SO 04 VRATNICE / GUARDHOUSE
 - SO 05 OPLOČENÍ / FENCING
 - SO 06 PŘÍSTŘEŠEK PRO KOLA A MOPEDY / BICYCLES SHED
 - SO 07 KIOSEK PLYNU / GAS MEASUREMENT
 - SO 08 VLAKOVÉ POLE / FLAGS YARD
 - SO 09 ZALOŽNÍ ZDROJ / BACKUP POWER
- INŽENÝRSKÉ OBJEKTY / ENGINEERING OBJECTS
- IO 21 HRUBÉ TERÉNNÍ ÚPRAVY - ŘEŠENY SAMOSTATNÝM PROJEKTEM / GRADING WORKS - SOLUTION IN SEPARATE PROJECT
 - IO 22 KONEČNÉ TERÉNNÍ ÚPRAVY, SADOVÉ ÚPRAVY / LANDSCAPING
 - IO 23 KOMUNIKACE A ZPEVNĚNÉ PLOCHY / ROADS
 - IO 23.1 KOMUNIKACE, ZPEVNĚNÉ PLOCHY I. ETAPA / ROADS, PAVED AREAS I. PHASE
 - IO 23.2 KOMUNIKACE, ZPEVNĚNÉ PLOCHY II. ETAPA / ROADS, PAVED AREAS II. PHASE
 - IO 23.3 KOMUNIKACE, ZPEVNĚNÉ PLOCHY III. ETAPA / ROADS, PAVED AREAS III. PHASE
 - IO 24 VODNÍ HOSPODÁŘSTVÍ / WATER MANAGEMENT
 - IO 24.1 VODOVOD PITNÝ / POTABLE WATER DISTRIBUTION
 - IO 24.1.1 VODOVOD PITNÝ I. ETAPA / POTABLE WATER DISTRIBUTION I. PHASE
 - IO 24.1.2 VODOVOD PITNÝ II. ETAPA / POTABLE WATER DISTRIBUTION II. PHASE
 - IO 24.1.3 VODOVOD PITNÝ III. ETAPA / POTABLE WATER DISTRIBUTION III. PHASE
 - IO 24.2 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ / UTILITY AND FIRE WATER DISTRIBUTION
 - IO 24.2.1 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ I. ETAPA / UTILITY AND FIRE WATER DISTRIBUTION I. PHASE
 - IO 24.2.2 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ II. ETAPA / UTILITY AND FIRE WATER DISTRIBUTION II. PHASE
 - IO 24.2.3 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ III. ETAPA / UTILITY AND FIRE WATER DISTRIBUTION III. PHASE
 - IO 24.3 KANALIZACE SPLAŠKOVÁ / WASTE WATER SEWAGE
 - IO 24.3.1 KANALIZACE SPLAŠKOVÁ I. ETAPA / WASTE WATER SEWAGE I. PHASE
 - IO 24.3.2 KANALIZACE SPLAŠKOVÁ II. ETAPA / WASTE WATER SEWAGE II. PHASE
 - IO 24.3.3 KANALIZACE SPLAŠKOVÁ III. ETAPA / WASTE WATER SEWAGE III. PHASE
 - IO 24.4 KANALIZACE DEŠŤOVÁ / RAIN WATER SEWAGE
 - IO 24.4.1 KANALIZACE DEŠŤOVÁ I. ETAPA / RAIN WATER SEWAGE I. PHASE
 - IO 24.4.2 KANALIZACE DEŠŤOVÁ II. ETAPA / RAIN WATER SEWAGE II. PHASE
 - IO 24.4.3 KANALIZACE DEŠŤOVÁ III. ETAPA / RAIN WATER SEWAGE III. PHASE
 - IO 24.5 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ / ROADS AND PAVED AREAS DRAINAGE
 - IO 24.5.1 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ I. ETAPA / ROADS AND PAVED AREAS DRAINAGE I. PHASE
 - IO 24.5.2 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ II. ETAPA / ROADS AND PAVED AREAS DRAINAGE II. PHASE
 - IO 24.5.3 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ III. ETAPA / ROADS AND PAVED AREAS DRAINAGE III. PHASE
 - IO 24.6 RETENČNÍ NÁDRŽ / RETENTION TANK
 - IO 24.6.1 RETENČNÍ NÁDRŽ I. ETAPA / RETENTION TANK I. PHASE
 - IO 24.6.2 RETENČNÍ NÁDRŽ II. ETAPA / RETENTION TANK II. PHASE
 - IO 24.7 VÝTLAK VYČISTĚNÝCH PRŮMYSLOVÝCH VODŮ / DELIVERY OF CLEANED INDUSTRIAL WATER
 - IO 25 VNĚJŠÍ ELEKTRICKÉ ROZVODY / EXTERNAL POWER DISTRIBUTION
 - IO 25.1 PŘÍPOJKY ELEKTRICKÉ ENERGIE VN / INCOMING LINE MV
 - IO 25.1.1 VSTUPNÍ SPÍNAČÍ STANICE VN R22.1 - I. ETAPA / INCOMING SUBSTATION HV 22kV I. PHASE
 - IO 25.1.2 VSTUPNÍ SPÍNAČÍ STANICE VN R22.1 - II. A III. ETAPA / INCOMING SUBSTATION HV 22kV II. AND III. PHASE
 - IO 25.1.3 PŘÍPOJKA VN 22 kV, I. A II. ETAPA / CONNECTION LINE HV 22 kV I. AND II. PHASE
 - IO 25.2 AREÁLOVÉ SILNOPRŮBUDÉ ROZVODY VN / EXTERNAL POWER SUPPLY MV
 - IO 25.2.1 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY VN 22kV I. ETAPA / EXTERNAL POWER SUPPLY MV 22kV I. PHASE
 - IO 25.2.2 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY VN 22 kV II. A III. ETAPA / EXTERNAL POWER SUPPLY MV 22kV II. AND III. PHASE
 - IO 25.3 AREÁLOVÉ SILNOPRŮBUDÉ ROZVODY NN / EXTERNAL POWER SUPPLY LV
 - IO 25.3.1 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY NN 0.4kV I. ETAPA / EXTERNAL POWER SUPPLY LV 0.4kV I. PHASE
 - IO 25.3.2 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY NN 0.4kV II. A III. ETAPA / EXTERNAL POWER SUPPLY LV 0.4kV II. AND III. PHASE
 - IO 25.4 AREÁLOVÉ VENKOVNÍ OSVĚTLENÍ / EXTERNAL LIGHTING
 - IO 25.4.1 VENKOVNÍ OSVĚTLENÍ I. ETAPA / EXTERNAL LIGHTING I. PHASE
 - IO 25.4.2 VENKOVNÍ OSVĚTLENÍ II. A III. ETAPA / EXTERNAL LIGHTING II. AND III. PHASE
 - IO 26 VNĚJŠÍ SLABOPRŮBUDÉ ROZVODY / EXTERNAL COMMUNICATIONS
 - IO 26.1 PŘÍPOJKA SLABOPRŮBUDY / COMMUNICATIONS CONNECTION
 - IO 26.2 AREÁLOVÉ ROZVODY SLABOPRŮBUDY / COMMUNICATIONS DISTRIBUTION
 - IO 27 VNĚJŠÍ ROZVODY ZEEMNÍHO PLYNU / EXTERNAL GAS
 - IO 27.1 PŘÍPOJKA PLYNU / GAS CONNECTION
 - IO 27.2 AREÁLOVÉ ROZVODY PLYNU / GAS DISTRIBUTION





VÝROBNÍ HALA - 1NP		SO 02	
PRODUCTION HALL - GROUND FLOOR			
CON. ITEM	ČÍSLO MÍSTNOSTI USE OF ROOM	PLOCHA AREA (m²)	SÝSTĚLA VÝŠKA CEILING HEIGHT (m)
1.01	JÍDELNA CATERING	127,9	3,0
1.02a	VÝVODNÁ JÍDEL FOOD OUTPUT	73,4	3,0
1.02b	UMÝVARNÁ STOLNOHO NADOBI WASHROOM DISHES	17,1	3,0
1.02c	UMÝVARNÁ TERMOPROSTŘEDÍ A NADOBI WASHROOM DISHES + THERMOPORES	4,6	3,0
1.03	CHLÁZENÝ BOX COOLED BOX	4,3	3,0
1.04a	CHODB STOCK	6,6	3,0
1.02f	CHODBA CORRIDOR	10,0	3,0
1.05	VSTUP/ZÁSOBOVÁNÍ GASTRA ENTRANCE/FOOD SUPPLY	8,8	3,0
1.02h	MÍSTNOST NA ODPAKY WASTE	4,0	3,0
1.06	ADMINISTRATIVNÍ KOUT OFFICE	8,0	3,0
1.07	SATNA+SPROCHA MUŽI LOCKERS+SHOWER MEN	6,0	3,0
1.08	SATNA+SPROCHA ŽENY LOCKERS+SHOWER WOMEN	6,1	3,0
1.09	WC ZAMĚSTNANCŮ TOILET EMPLOYEES	3,5	3,0
1.03	NEOSAZENO NOT USED	–	–
1.04	CHODBA CORRIDOR	34,3	3,0
1.05	CHODBA CORRIDOR	133,0	3,0
1.06	PŘEDSÍŇ WC MUŽI TOILET MALE - HALL	5,0	2,5
1.07	WC MUŽI TOILET MALE	20,4	2,5
1.08	PŘEDSÍŇ WC ŽENY TOILET FEMALE - HALL	5,4	2,5
1.09	WC ŽENY TOILET FEMALE	13,7	2,5

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR		S0 02	
ČÍSLO ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	POCITA AREA [m²]	SVĚTLÁ VÝŠKA CEILING HEIGHT [m]
1.10	OKŘÍDOVÁ MÍSTNOST CLEANING ROOM	2,7	2,5
1.11	NÁHRADNÍ DÍLY SPARE PARTS	295,2	3,7/3,6*
1.12	OKŘÍDOVÝ CORRIDOR	22,1	3,7
1.13	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	36,8	3,8
1.14	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	20,9	3,8
1.15-1.19	NEOSAZENO NOT USED	–	–
1.20	KANCELÁŘ OFFICE	19,8	3,0
1.21	GORŽIZA CORRIDOR	285,4	7,6*
1.22	KANCELÁŘ ELEKTRO ODRŽBY ELECTRIC ELECTRO	29,6	3,0
1.23	KANCELÁŘ OFFICE	28,0	3,0
1.24	LABORATOR LABORATORY	160,5	3,0
1.25	TRŽENÍ CURING	21,2	3,5
1.26	TECHNICKÁ MÍSTNOST EQUIPMENT ROOM No.1	46,9	3,5
1.27	KANCELÁŘ KVALITY QUALITY CONTROL	33,4	3,0
1.27a	CHODBA CORRIDOR	5,9	3,0
1.28	KANCELÁŘ PŘÍJMU DELIVERY OFFICE	30,0	3,0
1.29	CHODBA CORRIDOR	12,3	3,0
1.30	WC ŘÍDÍČ TOILET DRIVERS	2,8	2,5
1.30a	OKŘÍDOVÁ MÍSTNOST CLEANING ROOM	10,7	2,5
1.31	WC MUŽI TOILET MALE	11,3	2,5

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR			S0 02
QZN	QČL MÍSTNOSTI USE OF ROOM	PLOCHA AREA (m²)	SVĚTLA VÝŠKA CEILING HEIGHT
1.32	WC ŽENY TOILET FEMALE	4,9	2,5
1.33a	EXPEDIENCE FINAL EXPEDITION	870,4	5,3*
1.33b	ROZVÁDĚČ RPA A EPS FIRE SWITCHROOM	9,0	3,0
1.34	KONTROLA BALENÍ CONTROL PACKING ROOM	508,2	4,0
1.35	POKROČILÉ PLATING	7031,5	6,7*
1.36	SPLETÁNÍ A NAVÁZÍ SPINNING AND CABELING	9413,1	5,1*
1.37	FINÁLNÍ PROTAHOVÁNÍ FINAL DRAWING	4870,4	5,1*
1.38	LUBRIKANT LUBRICANT TANKS	645,5	5,1*
1.39a	TANKY KYSLEČNÍ - SAKK AD STORAGE - TANKS	96,1	5,1*
1.39b	WC MUŽI TOILET MALE	16,9	2,5
1.39c	ODHLAŽOVÁ MÍSTNOST CLEANING ROOM	3,6	2,5
1.40	WC ŽENY TOILET FEMALE	12,0	2,5
1.41	NOT USED	---	---
1.42	KANCELÁŘ KONTROLY QC SUPERVISOR OFFICE	18,0	3,0
1.43	KANCELÁŘ VEDOUČHO KONTROLY QC LEADER MAN OFFICE	16,2	3,0
1.44	KANCELÁŘ VÝVOJE DEVELOPMENT TEAM	35,7	3,0
1.45	SKLAD SVAŘENÍ WELDERS TOOLS STORAGE	37,9	3,0
1.46	PRŮVĚNY / PRAZDINE QWY QC REVISER / EMPTY SPOKS STOCK	232,5	5,1*
1.47	KANCELÁŘ KONTROLY POKOVENÍ FIN. SUPERVISOR OFFICE	18,3	3,0
1.48	KANCELÁŘ KONTROLY POKOVENÍ FIN. SUPERVISOR OFFICE	16,7	3,0

VÝROBNÍ HALA - 1NP		S0 02	
PRODUCTION HALL - GROUND FLOOR			
QZM	QZM NOSTNOSTI USE OF ROOM	POCITA M ²	SVĚTLA VÝŠKA CEILING HEIGHT
1.49	KANCELARIE OFFICE	37,7	3,0
1.50	OKNAKVI CHODBA EASC CORRIDOR	8,7	2,5
1.51	ROZVOJNA NV HV SUBSTATION	18,0	3,5
1.51a	ROZVOJNA NV LV SUBSTATION	13,0	3,5
1.52a	TRANSFORMACE TRANSFORMER ROOM	9,7	3,5
1.52b	TRANSFORMACE TRANSFORMER ROOM	9,5	3,5
1.53	ROZVOJNA NV LV SUBSTATION	77,2	3,5
1.54	KUKA KOVŮCHÍ DÍLO QUEN STATION	39,3	5,1*
1.55	PŘÍPRAVA A KUKA CHEMICAL PREPARATION AND STOREY	23,9	5,1*
1.56	NEČISTAZNA NOT USE	----	----
1.57	KOTELNA BOLER ROOM	68,5	5,1*
1.57a	CHODBA CORRIDOR	9,2	2,5
1.58	KOMPRESOROVNA COMPRESSOR ROOM	84,9	5,1*
1.59	ROZVOJNA NV LV SUBSTATION	76,2	3,5
1.59a	ROZVOJNA GRENTAČNÍ OSVĚTLENÍ GRENTATION LIGHTING SUBSTATION	8,0	3,5
1.59b	REZERVA RESERVE	7,9	3,5
1.60a	TRANSFORMACE T1 TRANSFORMER ROOM T1	9,7	3,5
1.60b	TRANSFORMACE T2 TRANSFORMER ROOM T2	9,3	3,5
1.61	ROZVOJNA NV HV SUBSTATION	18,0	3,5
1.62	TRANSFORMACE (*REZERVA) TRANSFORMER ROOM T2 (*RESERVE)	9,7	3,5



VÝROBNÁ HAL - LNP PRODUCTION HALL - GROUND FLOOR			SO 02
QZN	QČL MIENOSI USE OF ROOM	POCMA AREA (m ²)	SVETLA VYSKA CEILING HEIGHT (m)
1.62b	TRANSFORMACE T3 TRANSFORMER ROOM T3	9,3	3,5
1.63	ROZVODNA VN LY SUBSTATION	87,3	3,5
1.64	WC MUŽI TOILET MALE	18,1	2,5
1.65	WC ŽENY TOILET FEMALE	5,2	2,5
1.66	CHODBA CORRIDOR	8,3	2,5
1.67	KANCELAR OFFICE	26,8	3,0
1.68a	KANCELAR FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	16,9	3,0
1.68b	KANCELAR KANCELÁŘSKÝHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	18,0	3,0
1.69	SKLAD PROTAHOVACÍCH ČÍSTEK DIE SHOP	38,1	3,0
1.70	OPATY FINÁLNÍHO PŘEVĚRY TO SCHEMATS	150,0	5,1*
1.71	REGULAČNÍ STANICE PĚNU MIL CLOSER OF NG	4,5	3,2
1.72	HOŘENÍ PŘE-DRAWING	548,2	6,7*
1.72a	NÁSLUČI STANICE BATTERY CHARGING ROOM	80,5	6,7*
1.73	ROZVODNA VN LY SUBSTATION	108,6	3,6*
1.74	PRACHOVÉ FILTRY DUST COLLECTOR	76,0	7,5*
1.75	NEOBRÁZOVANÝ NOT USED		
1.76	ROZVODNA VN WV STATION	35,8	3,5
1.77	TRANSFORMACE T5 TRANSFORMER ROOM T5	35,8	3,5
1.78	TRANSFORMACE T6 - REZERVA TRANSFORMER ROOM T6 - RESERVE	34,4	3,5
1.79	PŘEDČERPAČNÍ STANICE, CHLAZENÍ VODY CIRCULATING WATER PUMPING STATION	104,6	3,6*

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR		\$0 02	
ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	POCITA PLOCHA AREA (m²)	SVĚTLA VÝŠKA CEILING HEIGHT
1.80	PŘÍMĚŠOVÁNÍ STANICE OPRÁV - VOD PUMPING STATION TO PUMP	48,5	3,6*
1.81	ÚNIKOVÁ CHODBA ESCAPE CORRIDOR	7,8	2,5
1.82	SKLAD NÁŘADNÍKŮ SPARE PARTS STORAGE	51,9	3,6*
1.83	PROVEDNĚNÍ LV LV SUBSTATION	110,9	3,6*
1.84	PRAČÍHOVÉ FILTRY DUST COLLECTOR	72,9	7,5*
1.85	WC MUŽI TOILET MALE	13,2	2,5
1.86	WC ŽENY TOILET FEMALE	5,0	2,5
1.87	OKYDLOVÁ KOMORA CLEANING ROOM	3,6	2,5
1.88	DEŽNÍ MÍSTNOST DIN ROOM	45,5	3,0
1.89	EXPEDIENCE FUEL EXPEDITION	721,1	5,3*
1.90	SKLAD ODPADŮ (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*

LEGENDA HMOT:

MATERIAL LIST:

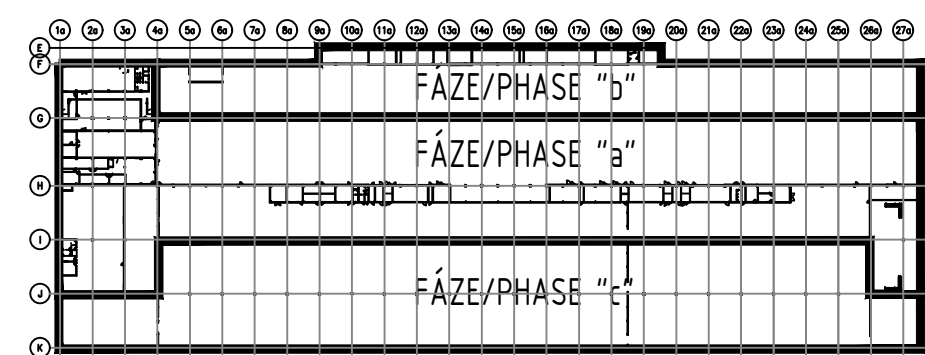
TERPÉNE POLYMER SENOŽŇOVÝ PANEĽ 1,150mm; SH 42,150mm
TERPÉNE INSULATED SANDWICH PANEĽ 1,150mm; BOTTOM 42,150mm
TERPÉNE POLYMER SENOŽŇOVÝ PANEĽ 1,100mm; SH 42,150mm
TERPÉNE INSULATED SANDWICH PANEĽ 1,100mm; BOTTOM 42,150mm
KERAMICKO ŽŤOZ. T. 250mm
CERAMIC MASONRY TH. 250mm
SEKVENČNOSTNÝ PANEĽ T. 150mm
FLUSTRBOARD WALL TH. 150mm

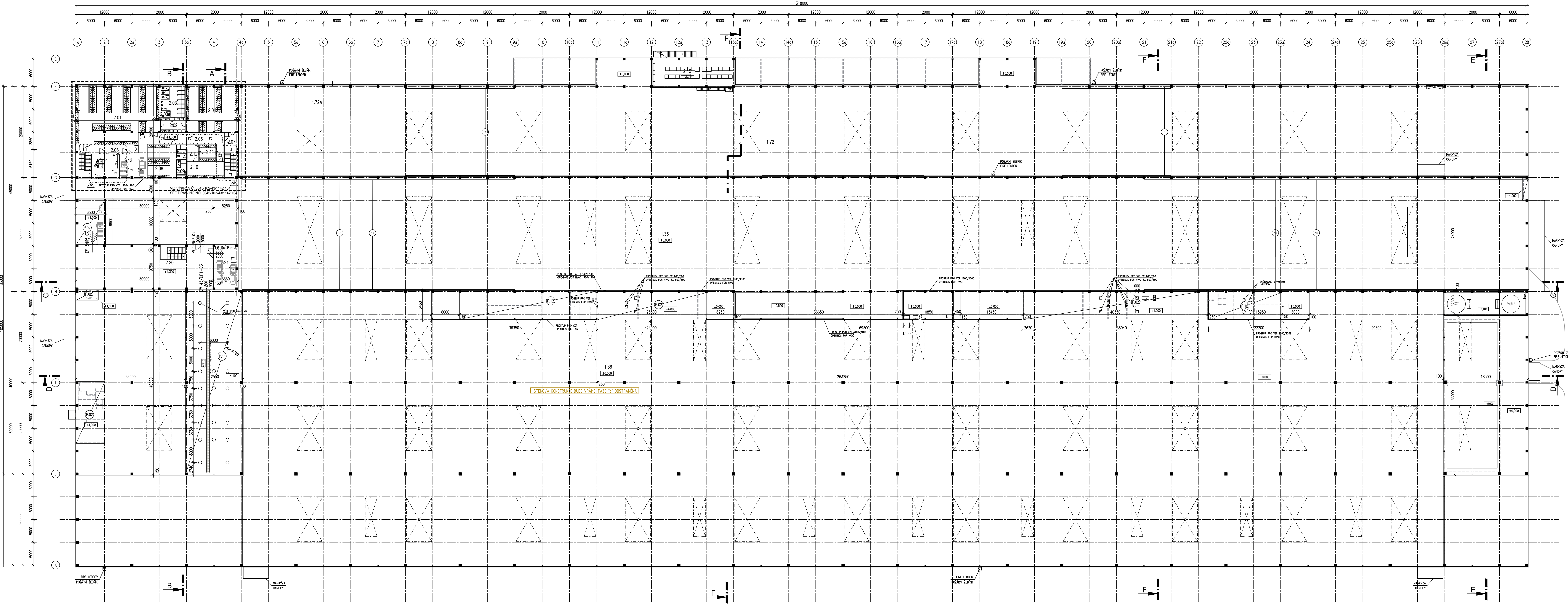
POZNÁMKA / NOTE:

- POVS SÚBORNÝ KONŠTRUKČNÝ-VIS 0045-102-43/181 001
- (DETAILS OF STRUCTURE-SEE DRAWING 0045-102-43/181 001)

BS	BEZPEČNOSTNÁ SPRCHA EMERGENCY SHOWER
JX	JAKO SUMP
PV	PODNIKOVÁ VÝUST FLOOR DRAINLET
ČZ	ČISTNÁ RAKVA (VYTERNÁ A VNUTRNÁ) CLEAN RAKES (EXTERNAL AND INTERIOR)
OS	ODSÚŠNICA EYE SPOUNDER
85-L4	85VNÝ KANÁL 85x100x100mm, 85x100x100x 8000mm

[illegible]

PŮDORYS 1.NP, M 1:250 / LAYOUT OF GROUND FLOOR, Sc:1:250



VÝROBNÍ HALA - 2.NP PRODUCTION HALL - FIRST FLOOR			SO 02
OZN. ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	SVĚTLÁ VÝŠKA CEILING HEIGHT [m]
2.01	SÁTKY MUŽI LOCKERS MEN	223,7	3,0
2.02	UMÝVADLOVÁ PŘEDÍR MEN - SINK ANTE-ROOM	16,4	3,0
2.03	SPRCHY + WC SHOWERS + TOILETS MEN	33,6	2,5
2.03a	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,6	2,5
2.04	SÁTKY ŽENY LOCKERS WOMEN	116,6	3,0
2.05	CHODBA CORRIDOR	55,5	3,0
2.06	CHODBA CORRIDOR	42,6	3,0
2.07	CHODBA CORRIDOR	29,1	3,0
2.08	SÁTKY ŽENY LOCKERS WOMEN	44,3	3,0
2.09	SPRCHY + WC ŽENY SHOWERS + TOILETS WOMEN	7,3	3,0
2.10	HYGIENICKÁ SÁTKA MUŽI HYGIENIC LOCKERS MEN	28,0	3,0
2.11	ČISTÁ SÁTKA MUŽI HYGIENIC LOCKERS MEN	13,0	3,0
2.12	SPRCHY + WC SHOWERS + TOILETS MEN	15,1	2,5
2.13	STROJOVNA VZT HVAC TECHNICAL AREA	32,2	3,3*
2.14	KOTLOVNA BOILER ROOM	31,7	3,3*
2.15	ROZVODNA NN LV SUBSTATION	111,4	3,5*

2.20	SKLAD PRO LABORATOR STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

SKLADBA STŘEŠNÍHO PLÁŠTĚ:
ROOF COMPOSITION:

- 5.01 STŘEŠNÍ HYDROIZOLAČNÍ FOLIE
ROOF WATERPROOFING MEMBRANE
- 5.02 TRAPEZOVÝ STŘEŠNÍ PLECH
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- 5.03 TRAPEZOVÝ STŘEŠNÍ PLECH
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- 6.00 TRAPEZOVÝ STŘEŠNÍ PLECH
PROFILED SHEET

SKLADBA PODLAHY:
FLOOR COMPOSITION:

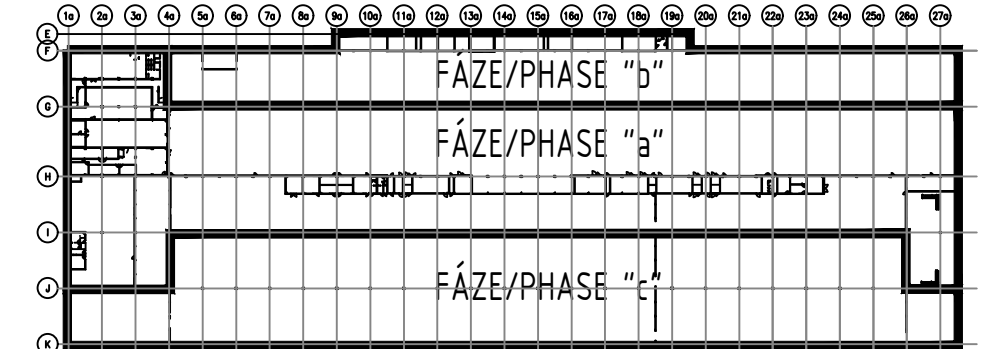
- 6.01 NÁSLAPNÁ VRSTVA DLE MÍSTNOSTI
FLOOR FINISHING ACC. TO ROOM
- 6.02 TRAPEZOVÝ PLECH S KÁŘI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.03 TRAPEZOVÝ PLECH S KÁŘI SÍTÍ
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- 6.04 TRAPEZOVÝ PLECH S KÁŘI SÍTÍ
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TRAPEZOID SHEET WITH STEEL GRID

LEGENDA HMOT:
MATERIAL LIST:

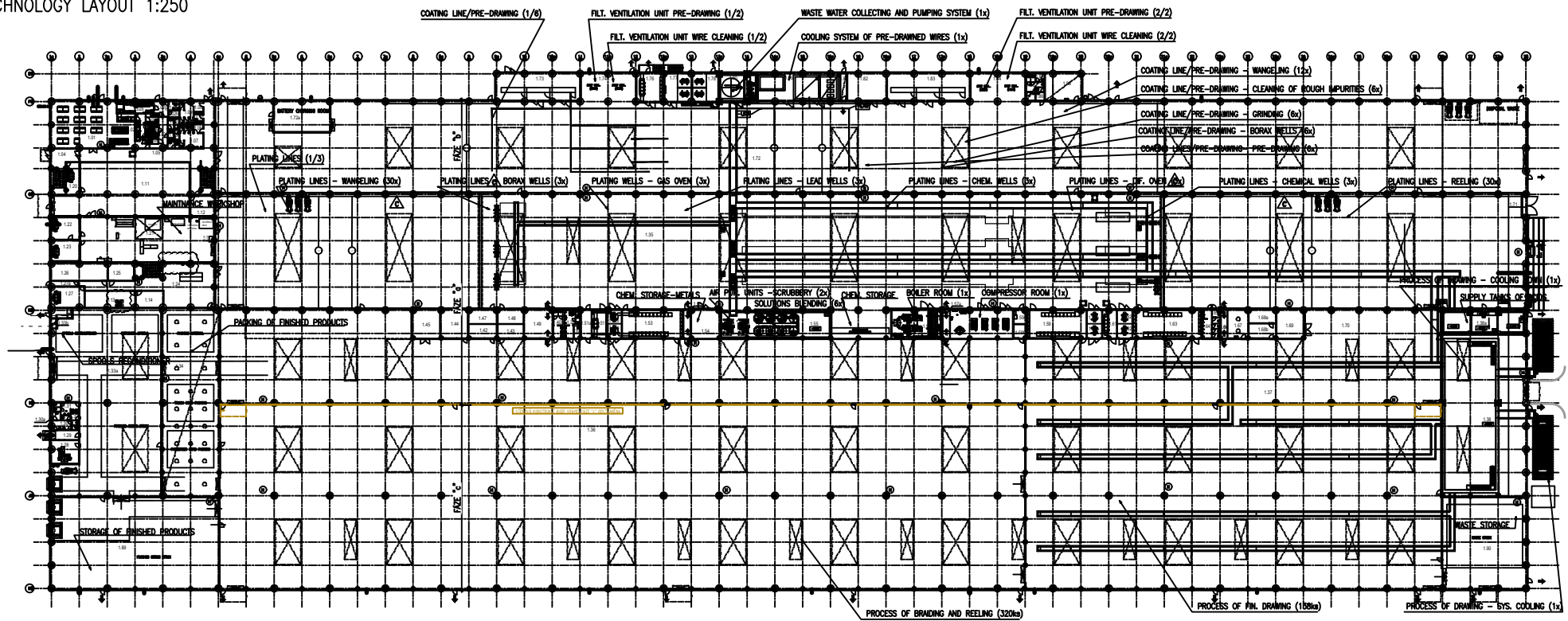
- TEPELNĚ IZOLAČNÍ SANDVIČOVÝ PANEL TL.150mm; SH. +2,150m
THERMAL INSULATED SANDWICH PANEL TH.150mm; SH. +2,150m
- TEPELNĚ IZOLAČNÍ SANDVIČOVÝ PANEL TL.100mm; SH. +2,150m
THERMAL INSULATED SANDWICH PANEL TH.100mm; SH. +2,150m
- KERAMICKÉ ŽIVO TL. 250mm
CERAMIC MASONRY TH. 250mm
- SKLOVAFIBROVÝ STĚNA TL. 150mm
GLASSFIBER REINFORCED PLASTERBOARD WALL TH. 150mm

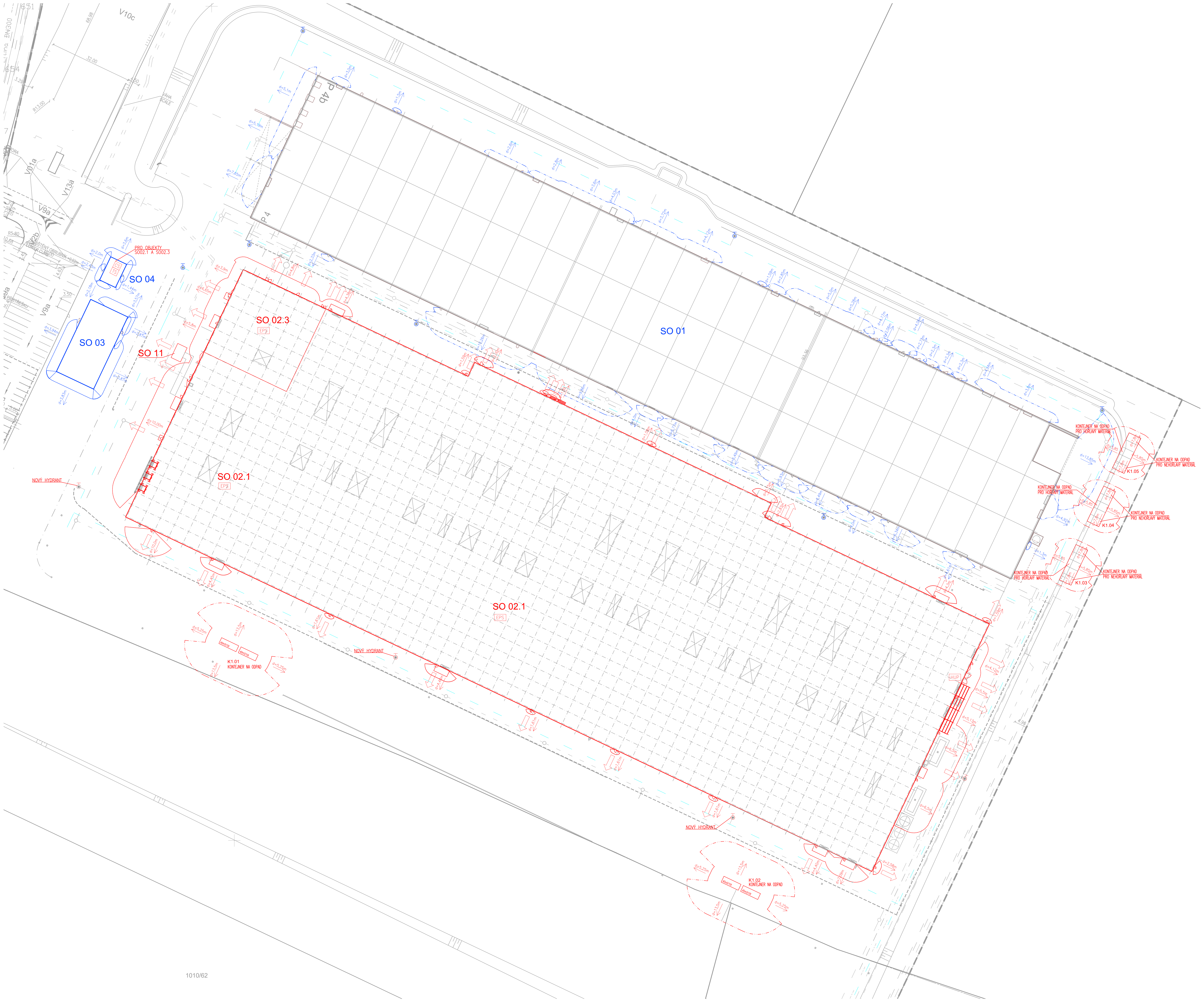
POZNÁMKA / NOTE:
- POPS SKLADBY KONSTRUKCÍ-VZ. 0045-102-43/1181 001
- DETAILS OF STRUCTURE-SEE DRAWING 0045-102-43/1181 001

- BS BEZPEČNOSTNÍ SPRCHA
EMERGENCY SHOWER
- JKA JAMA
SUMP
- PV PODLAHOVÝ VÝST
FLOOR OUTLET
- ČZ ČISTÍ ROKOŽ (VENKOVNÍ I VITRINÍ)
CLEAN MATS (EXTERNAL AND INTERIOR)
- OS OČNÍ SPRCHA
EYE SHOWER
- RS14 REZEVNÍ ŠACHTA 800x1000mm, RYBNÝŠKOVÝ POKLOP
600x900mm, STĚNA TL. 250mm, STUPAČKA DNO DLE
PROJEKTU KANALIZACE - CELKEM 4 ks
MANHOLES 800x1000mm, GAS-TIGHT HATCH 600x900mm
WALL THICKNESS 250mm + STEPS, BOTTOM ACC. TO SEWAGE
SYSTEM PROJECT - TOTAL 4 ks
- OZN. HLoubka dna/bottom - STUPAČKA/STEPS
- RS1 -1,150 m 3 ks/pcs
- RS2 -2,200 m 7 ks/pcs
- RS3 -2,000 m 7 ks/pcs
- RS4 -3,570 m 11 ks/pcs



TECHNOLOGY LAYOUT 1:250

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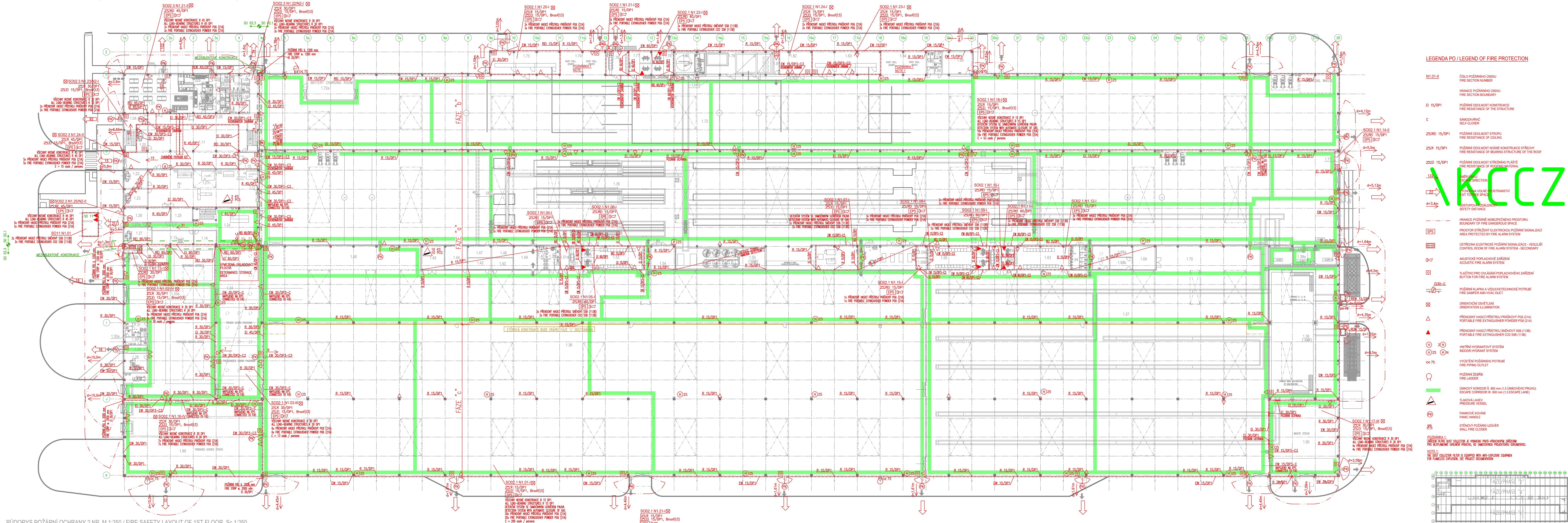
LEGENDA PO / LEGEND OF FIRE PROTECTION

- SMYSL ÚNIKU
ESCAPE DIRECTION
- VÝCHOD NA VOLNÉ PROSTORANÍ
EXIT TO FREE AREA
- ODSÚPOVÁ VZDÁLENOST
SAFETY DISTANCE
- HRANICE POŽÁRNĚ NEBEZPEČNÉHO PROSTORU
BOUNDARY OF FIRE DANGEROUS SPACE
- NADZEMNÍ POŽÁRNÍ HYDRANT - VODNÍ
ABOVE-GROUND FIRE HYDRANT
- PODZEMNÍ POŽÁRNÍ HYDRANT - VODNÍ
UNDERGROUND FIRE HYDRANT
- PROSTOR STŘEŽENÝ ELEKTRIKOU POŽÁRNÍ SIGNALIZACE
AREA PROTECTED BY FIRE ALARM SYSTEM
- ÚSTŘEDNA ELEKTRIKY POŽÁRNÍ SIGNALIZACE - VEDLEJŠÍ
CONTROL ROOM OF FIRE ALARM SYSTEM - SECONDARY
- STÁVAJÍCÍ ŘEŠENÍ POŽÁRNÍ BEZPEČNOSTI

STAVEBNÍ OBJEKTY / BUILDING OBJECTS

- SO 01 HALA BW / BEAD WIRE
- SO 02 HALA SC / STEEL CORD
- SO 02.1A HALA SC I. ETAPA - 1. FÁZE / SC PHASE I - PART 1
- SO 02.1B HALA SC I. ETAPA - 2. FÁZE / SC PHASE I - PART 2
- SO 02.1C HALA SC I. ETAPA - 3. FÁZE / SC PHASE I - PART 3
- SO 02.3 HALA SC - Central Battery / Central Isoterm
- SO 03 ADMINISTRATIVNÍ BUDOVA / OFFICE BUILDING
- SO 04 VRÁTNICE / GUARDHOUSE
- SO 11 SKLAD LAHVI / GAS STORAGE

PŮDORYS POŽÁRNÍ OCHRANY 1.NP, M 1:250 / FIRE SAFETY LAYOUT OF GROUND FLOOR, Sc:1:250



PŮDORYS POŽÁRNÍ OCHRANY 2.NP, M 1:250 / FIRE SAFETY LAYOUT OF 1ST FLOOR, Sc.1:250

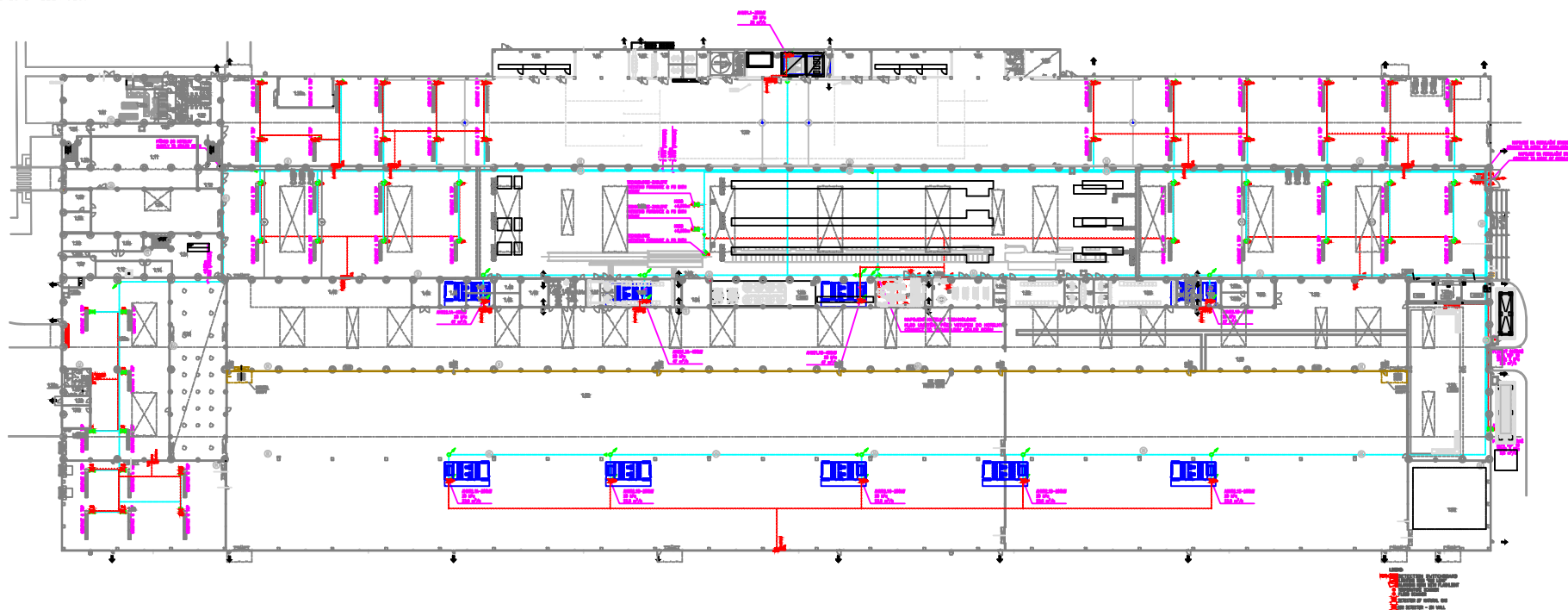
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.01	JEWELRY CANTERS	127.9	3.0
1.02a	YOGESHA - IDEAL FLOOR	75.4	3.0
1.02b	UNIFORMS STORAGE AND DRESSING ROOMS	17.1	3.0
1.03	UNIFORMS TEMPORARY STORAGE ROOMS + THEATROPOLES	47.3	3.0
1.04	CHANGING BOX COOLED BOX	47.3	3.0
1.05	STOCK	2.7	3.0
1.06	STOCK	14.1	3.0
1.07a	ENTRANCE/STORAGE DACTRA ENTRANCE/STOCK SUPPLY	8.9	3.0
1.07b	MINORISTHALL NO. OPERARY OFFICE	3.0	3.0
1.08	ADMINISTRATIVE HOUT OFFICE	4.8	3.0
1.09	SANITARY SPACIAL ZONE LOCKERS FOR MEN	6.0	3.0
1.10	SANITARY SPACIAL ZONE LOCKERS FOR WOMEN	6.1	3.0
1.11	WC. ZEMINATIONS TRUST EMPLOYEES	3.5	3.0
1.12	NEEDS/STOCK NOT USED	-	-
1.13	CHANGING ROOM	34.3	3.0
1.14	CHANGING ROOM	153.0	3.0
1.15	PROFESSOR MC. TOLLET MALE - MALE	5.0	2.5
1.16	MC. TOLLET MALE - MALE	20.4	2.5
1.17	PROFESSOR MC. TOLLET FEMALE - FEMALE	5.4	2.5

PRODUCTION MILL - GROUND FLOOR				
ITEM	USE OF ROOM	AREA	CEILING HEIGHT	
1.00	PROSESS MC ZINCY TWOYF PINE - HALL	5.4	2.5	
1.00	MC ZINCY TRUCK LANE	13.7	2.5	
1.01	DUNLOVW MONTGOT CLEANING ROOM	2.7	2.5	
1.11	MANHOUN ZINCY SPRUE PARTS	290.3	3.7/7.8*	
1.12	CHICKEN CORRIDOR	22.1	3.7	
1.13	DRUG CHAMBER CHEMICAL STORAGE	30.8	3.8	
1.14	DRUG CHAMBER CHEMICAL STORAGE	20.9	3.8	
1.15-1.18	RENOVATION NOT USED	-	-	
1.20	HANGELER OFFICE	19.8	3.0	
1.21	LOSTRA MECHANISM	28.5	7.8*	
1.22	HANGELER ELECTRO DORSEY ELECTRO	29.6	3.0	
1.23	HANGELER OFFICE	28.0	3.0	
1.24	LABORATORY	160.5	3.0	
1.25	TRUCKIN EQUIPMENT	71.1	3.5	
1.26	TECHNISH MONTGOT CURING ROOM No.1	46.9	3.5	
1.27	TECHNISH MONTGOT QUALITY CONTROL	55.4	3.0	
1.27a	CHICKEN CORRIDOR	5.9	3.0	
1.28	HANGELER PRSANG REMOYD OFFICE	30.0	3.0	
1.29	CHICKEN CORRIDOR	12.3	3.0	

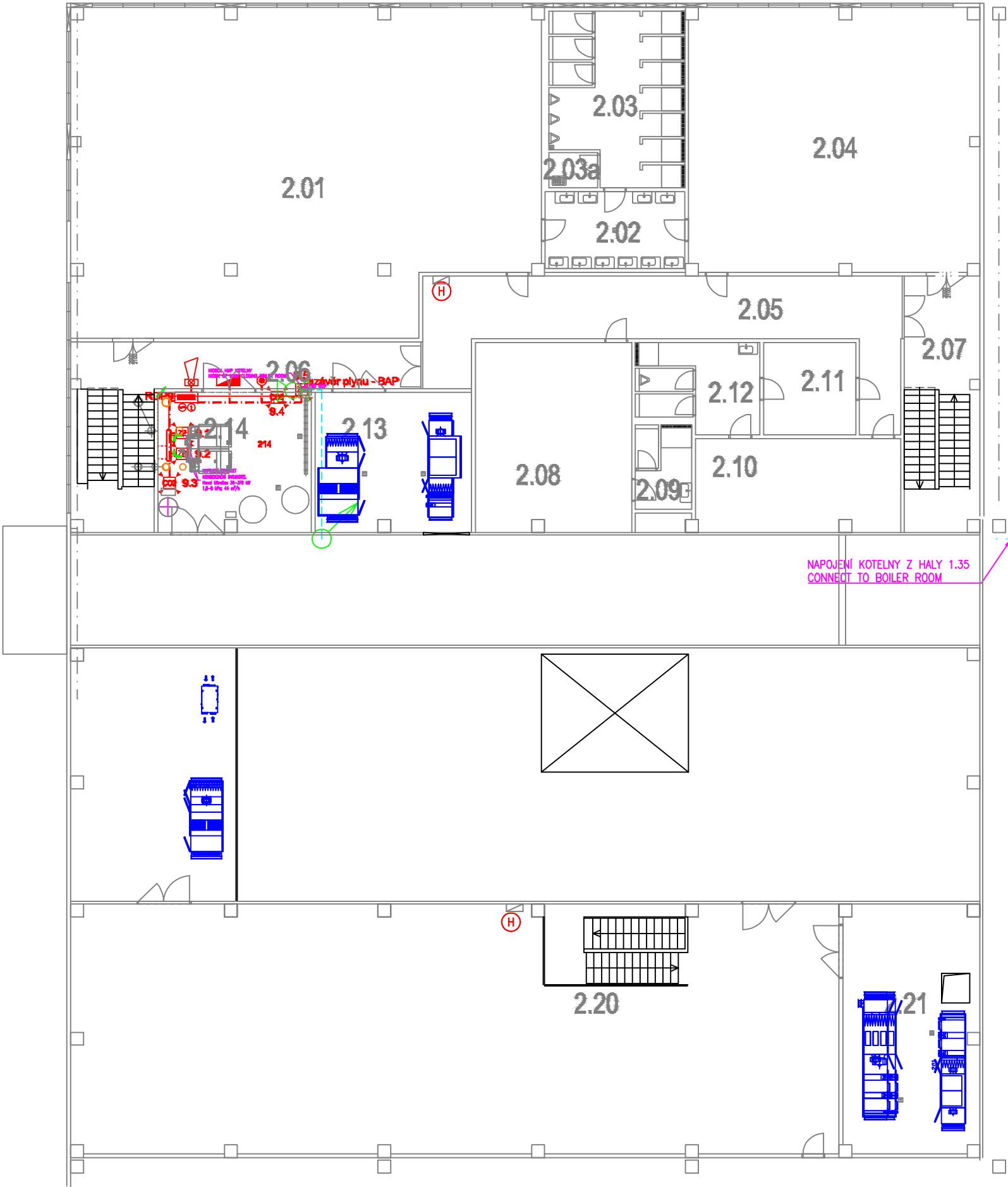
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.30	HC FLOOR	10.7	2.5
1.31	TOILET DRESS	1.0	2.5
1.32	DUCLOM METROST CLEANING ROOM	11.8	2.5
1.33	HC M2/1 TOILET MALE	2.3	2.5
1.34	HC FLOOR	4.9	2.5
1.35	TOILET FEMALE	1.0	2.5
1.36	ENTRANCE	870.4	6.5*
1.37	FINAL EXPEDITION	—	—
1.32b	BOUNDS & 400 FIRE SMOOTHER	9.0	3.0
1.34	BOUNDS & 400 CLOAKING ROOM	508.2	4.0
1.35	PODOLAN PLANTING	7031.5	6.7*
1.36	SILKENT & ANGLE INTERIOR	9415.1	5.1*
1.37	FINALE PRODUCTION FINAL	4870.4	5.1*
1.38	LIBRARY	10.0	2.5
1.39	LIBRARY	645.5	5.1*
1.40	SALU SYKES - TARKY AND TARKY - TARKY	86.1	5.1*
1.41	HC M2/1 TOILET MALE	16.9	2.5
1.39b	DUCLOM METROST CLEANING ROOM	3.6	2.5
1.40	HC FLOOR	12.0	2.5
1.41	TOILET FEMALE	—	—
1.42	TOILET MALE	—	—
1.43	MANAGER CONTROL OR SUPERVISOR	18.0	3.0
1.44	KANELLAS VOODOO CONTROL OR SLAYER OFFICE	—	—
1.45	KANELLAS VOODOO DEVELOPMENT PLAN	36.7	3.0
1.44	KANELLAS VOODOO DEVELOPMENT PLAN	16.2	3.0

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
145	SKUPŠTINA MEDICINSKI SKLADIŠTE	37,9	3,0
146	PROJEKCIJA I PRAZNOJE OPCIJE KAMARILICA ZA PRAZNOJE OPCIJE	32,5	5,1*
147	PLATING SUPERVISOR'S OFFICE	16,7	3,0
148	KAMARILICA KONTROLNICE PLATING SUPERVISOR OFFICE	16,7	3,0
149	KAMARILICA OFFICE	37,7	3,0
150	DRIVING SCHOOL CISAR'S CORRIDOR	8,7	2,5
151	ROZDOVNJA NN NN SUPERVISOR	18,0	3,5
151a	ROZDOVNJA NN NN SUPERVISOR	13,0	3,5
152	TRANSFORMANCE TRANSFORMER ROOM	9,7	3,5
152a	TRANSFORMANCE TRANSFORMER ROOM	8,5	3,5
153	ROZDOVNJA NN NN SUPERVISOR	77,2	3,5
154	SKUPŠTINA CISAR'S STORAGE	38,3	5,1*
155	PERMANENT & SOLID CHEMICAL CHEMICAL PREPARATION AND STORAGE	237,9	3,0
156	HYDROLYZ BOILER	0,0	---
157	HYDROLYZ BOILER	68,5	5,1
157a	CISAR'S CORRIDOR	9,2	2,5
158	KOMPRESORNA COMPRESSOR ROOM	84,9	5,1
159	ROZDOVNJA NN NN SUPERVISOR	76,2	3,5
159a	ROZDOVNJA ODRZAVANJE GOVETINE NN SUPERVISOR	8,0	3,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.59	ROZVOJNA	7.9	3.5
1.60	ROZVOJNA	7.9	3.5
1.60	TRANSFORMER ROOM T1	7.9	3.5
1.60	TRANSFORMER ROOM T2	9.3	3.5
1.61	ROZVOJNA	18.0	3.5
1.62	TRANSFORMER (KOTLOVNA)	7.9	3.5
1.62	TRANSFORMER ROOM T4 (SHR)	7.9	3.5
1.62	TRANSFORMER ROOM T3	9.3	3.5
1.63	ROZVOJNA	87.3	3.5
1.64	WASH TOILET MALE	18.1	2.5
1.65	WC FENY	5.2	2.5
1.65	TOILET FEMALE	5.2	2.5
1.66	CHOP	8.5	2.0
1.67	KANCELARIA	26.8	3.0
1.68	KANCELARIA FENILNOI PROTAFILNE FANIL GRAMING OFFICE	16.9	3.0
1.68	KANCELARIA FENILNOI PROTAFILNE FANIL GRAMING OFFICE	18.0	3.0
1.69	OKRUG PROJEKTOVACHI DEZIGN	38.1	3.0
1.70	OKRUG PROJEKTOVACHI DEZIGN	15.0	5.1*
1.71	REGULAZI STANCIJA FANIL MAN ELEKTRIC	4.5	3.2
1.72	PROJEKT FILTR	76.0	7.0*
1.73	NEPROIZVODNO		
1.75	ROZVOJNA	35.8	3.5

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GAS DETECTION FIRST FLOOR 1:50

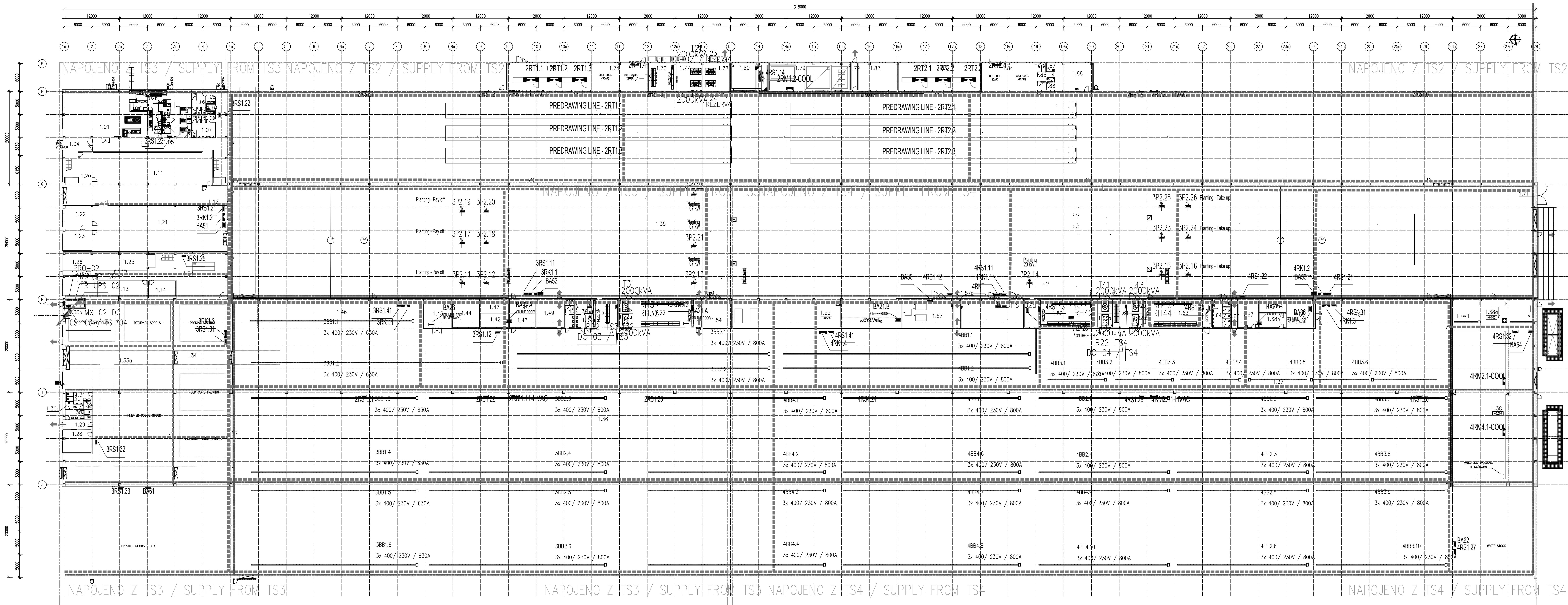


VÝROBNÍ HALA - 2NP		S0 02	
PRODUCTION HALL - FIRST FLOOR			
OZN. ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	SVĚTLÁ VÝŠKA CEILING HEIGHT [m]
2.01	ŠATNY MUŽI LOCKERS MEN	223,7	3,0
2.02	UMÝVADLOVÁ PŘEDÍŇ MEN – SINK ANTE-ROOM	16,4	3,0
2.03	SPRCHY + WC SHOWERS + TOILETS MEN	33,6	2,5
2.03a	ÚKLIDOVÁ MÍSTNOST CLEANING ROOM	2,6	2,5
2.04	ŠATNY MUŽI LOCKERS MEN	116,6	3,0
2.05	CHODBA CORRIDOR	55,5	3,0
2.06	CHODBA CORRIDOR	42,6	3,0
2.07	CHODBA CORRIDOR	29,1	3,0
2.08	ŠATNY ŽENY LOCKERS WOMEN	44,3	3,0
2.09	SPRCHY + WC ŽENY SHOWERS + TOILETS WOMEN	7,3	3,0
2.10	HYGIENICKÁ ŠATNA MUŽI HYGIENIC LOCKERS MEN	28,0	3,0
2.11	ČISTÁ ŠATNA MUŽI HYGIENIC LOCKERS MEN	13,0	3,0
2.12	SPRCHY + WC SHOWERS + TOILETS MEN	15,1	2,5
2.13	STROJOVNA VZT HVAC TECHNICAL AREA	32,2	3,3*
2.14	KOTELNA BOILER ROOM	31,7	3,3*
2.15	ROZVODNA NN LV SUBSTATION	111,4	3,5*

2.20	SKLAD PRO LABORATOŘ STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

- LEGEND:
- RDPx DETECTION SWITCHBOARD
 - LIGHTING SIGN "GAS LEAK"
 - ☒ ALARMING HORN WITH FLASHLIGHT
 - ⊕ TEMPERATURE SCANNER
 - ⊖ FLOOD SCANNER
 - ⊕ DETECTOR OF NATURAL GAS
 - ⊖ CO2 DETECTOR - ON WALL

ELECTRICAL INTERIOR, GROUND FLOOR 1:250



PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling-Height
1.01	JÍDELNA CANTEN	127,9	3,0
1.02a	VÝROBNÁ JÍDELNÍ POKOJ	73,4	3,0
1.02b	UMÝVÁRNA STOLNÍHO NÁDOBÍ WASHROOM DISHES	17,1	3,0
1.02c	UMÝVÁRNA TERMOPORTÁ A NÁDOBÍ WASHROOM DISHES + THERMOPORTS	5,5	3,0
1.02d	CHLAZENÝ BOX COOLED BOX	4,7	3,0
1.02e	SKLAD STOCK	2,7	3,0
1.02f	CHOBOA CORRIDOR	14,1	3,0
1.02g	VSTUP/ZASOBOVÁNÍ GASTRA ENTRANCE/FOOD SUPPLY	8,9	3,0
1.02h	MÍSTNOST NA ODPAZU WASTE	3,0	3,0
1.02i	ADMINISTRATIVNÍ KOUT OFFICE	4,8	3,0
1.02j	SATNA+SPRCHA MUŽI LOCKERS+SHOWER MEN	6,0	3,0
1.02k	SATNA+SPRCHA ŽENY LOCKERS+SHOWER WOMEN	6,1	3,0
1.02l	WC ZAMĚSTNANCŮ TOILET EMPLOYEES	3,5	3,0
1.02m	NEOBAZENÝ NOT USED	---	---
1.02n	CHOBOA CORRIDOR	34,3	3,0
1.02o	CHOBOA CORRIDOR	133,0	3,0
1.02p	PŘÍSLUŠNÁ WC MUŽI TOILET MALE - HALL	5,0	2,5
1.02q	PŘÍSLUŠNÁ WC ŽENY TOILET FEMALE - HALL	5,4	2,5
1.02r	WC ŽENY TOILET FEMALE	13,7	2,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling-Height
1.10	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,7	2,5
1.11	NAHRADNÍ DÍLY SPARE PARTS	295,2	3,7/7,6*
1.12	CHOBOA CORRIDOR	22,1	3,7
1.12a	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	38,8	3,8
1.12b	CHLAZENÝ BOX COOLED BOX	20,9	3,8
1.12c	SKLAD STOCK	2,7	3,0
1.12d	CHOBOA CORRIDOR	14,1	3,0
1.12e	VSTUP/ZASOBOVÁNÍ GASTRA ENTRANCE/FOOD SUPPLY	8,9	3,0
1.12f	MÍSTNOST NA ODPAZU WASTE	3,0	3,0
1.12g	ADMINISTRATIVNÍ KOUT OFFICE	4,8	3,0
1.12h	SATNA+SPRCHA MUŽI LOCKERS+SHOWER MEN	6,0	3,0
1.12i	SATNA+SPRCHA ŽENY LOCKERS+SHOWER WOMEN	6,1	3,0
1.12j	WC ZAMĚSTNANCŮ TOILET EMPLOYEES	3,5	3,0
1.12k	NEOBAZENÝ NOT USED	---	---
1.12l	CHOBOA CORRIDOR	34,3	3,0
1.12m	CHOBOA CORRIDOR	133,0	3,0
1.12n	PŘÍSLUŠNÁ WC MUŽI TOILET MALE - HALL	5,0	2,5
1.12o	PŘÍSLUŠNÁ WC ŽENY TOILET FEMALE - HALL	5,4	2,5
1.12p	WC ŽENY TOILET FEMALE	13,7	2,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling-Height
1.32	WC ŽENY TOILET FEMALE	4,9	2,5
1.32a	EXPEDICE FINAL EXPEDITION	870,4	5,3*
1.32b	ROZVADEČ RPO A EPS FIRE SWITCHROOM	9,0	3,0
1.32c	KONTROLA BALENÍ CONTROL PACKING ROOM	508,2	4,0
1.32d	POKROVOVÝ PLÁSTIK	7031,5	6,7*
1.32e	SPLÉTÁNÍ A NAVAZOVÁNÍ TWISTING AND CABLEING	8413,1	5,1*
1.32f	FINÁLNÍ PROTAHOVÁNÍ FINAL DRAWING	4870,4	5,1*
1.32g	SKLAD KONTROLNÍ DÍLŮ CULZIN STORAGE	645,5	5,1*
1.32h	SKLAD KYSELIN - TANKY ACID STORAGE - TANKS	96,1	5,1*
1.32i	WC MUŽI TOILET MALE	16,9	2,5
1.32j	OKLADOVÁ MÍSTNOST CLEANING ROOM	3,6	2,5
1.32k	WC ŽENY TOILET FEMALE	12,0	2,5
1.32l	NOT USED	---	---
1.32m	KANCELÁŘ KONTROLY CB SUPERVISOR OFFICE	18,0	3,0
1.32n	KANCELÁŘ VEDOUČHO KONTROLY CB LEADER MAN OFFICE	16,2	3,0
1.32o	KANCELÁŘ KONTROLY KVALITY CB QUALITY CONTROL	35,7	3,0
1.32p	KANCELÁŘ PRŮMYSLU DEVELOPMENT TEAM	37,9	3,0
1.32q	SKLAD SVÁŘECÍ WELDERS TOOLS STORAGE	232,5	5,1*
1.32r	PŘÍSLUŠNÁ WC MUŽI TOILET MALE	10,7	2,5
1.32s	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,8	2,5
1.32t	WC ŽENY TOILET FEMALE	11,3	2,5

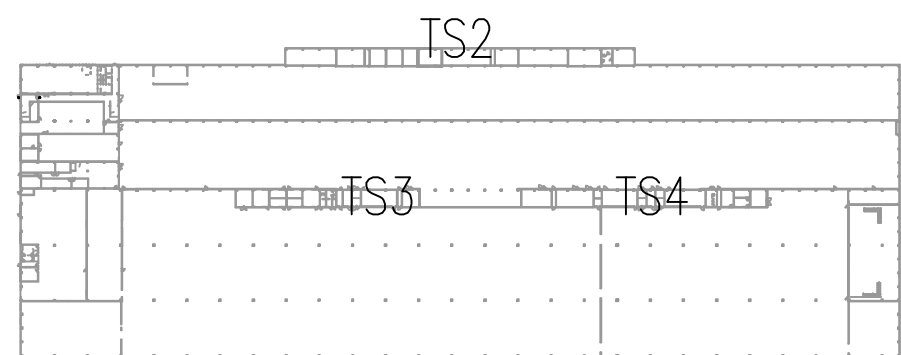
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling-Height
1.49	KANCELÁŘ OFFICE	37,7	3,0
1.50	OKNOVÁ CHOBOA ESCAPE CORRIDOR	8,7	2,5
1.51	ROZVADEČ VN HV SUBSTATION	18,0	3,5
1.51a	CHOBOA CORRIDOR	13,0	3,5
1.52a	TRAFOSTANICE TRANSFORMER ROOM	9,7	3,5
1.52b	TRAFOSTANICE TRANSFORMER ROOM	9,5	3,5
1.53	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	18,0	3,0
1.54	SKLAD PROTAHOVACÍCH OČEK ICE SHOP	39,3	5,1*
1.55	PŘÍPRAVA A SKLAD CHEMIKÁLÍ CHEMICAL PREPARATION AND STOREY	231,9	5,1*
1.56	NEOBAZENÝ NOT USED	---	---
1.57	KOTELNA HEATER ROOM	68,5	5,1*
1.57a	CHOBOA CORRIDOR	9,2	2,5
1.58	KOMPRESOROVNA COMPRESSOR ROOM	84,9	5,1*
1.59	ROZVADEČ VN HV SUBSTATION	76,2	3,5
1.59a	ROZVADEČ VN HV SUBSTATION	8,0	3,5
1.59b	REZERVA	7,9	3,5
1.60a	TRAFOSTANICE T1 TRANSFORMER ROOM T1	9,7	3,5
1.60b	TRAFOSTANICE T2 TRANSFORMER ROOM T2	9,3	3,5
1.61	ROZVADEČ VN HV SUBSTATION	18,0	3,5
1.62a	TRAFOSTANICE T4(REZERVA) TRANSFORMER ROOM T4 (SPARE)	9,7	3,5
1.62b	TRAFOSTANICE T3 TRANSFORMER ROOM T3	9,3	3,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling-Height
1.63	ROZVADEČ VN HV SUBSTATION	87,3	3,5
1.64	WC MUŽI TOILET MALE	18,1	2,5
1.65	WC ŽENY TOILET FEMALE	5,2	2,5
1.66	CHOBOA CORRIDOR	8,3	2,5
1.67	KANCELÁŘ OFFICE	26,8	3,0
1.68a	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	16,9	3,0
1.68b	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	18,0	3,0
1.69	SKLAD PROTAHOVACÍCH OČEK ICE SHOP	38,1	3,0
1.70	OPADY FINÁLNÍHO PREVENÍ FID SHOP	155,0	5,1*
1.71	REGULAČNÍ STANICE PLYNU MAIN CLOSER OF NG	4,5	3,2
1.72	MOŘENÍ PRE-DRAWING	5478,2	6,7*
1.72a	NABÍJEČ STANICE BATTERY CHARGING ROOM	80,5	6,7*
1.73	ROZVADEČ VN HV SUBSTATION	108,6	3,6*
1.74	PRAČOVNÍ FILTRY DUST COLLECTOR	76,0	7,5*
1.75	NEOBAZENÝ NOT USED	---	---
1.76	ROZVADEČ VN HV SUBSTATION	35,8	3,5
1.77	TRAFOSTANICE T5 TRANSFORMER ROOM T5	35,8	3,5
1.78	TRAFOSTANICE T6 - REZERVA	34,4	3,5
1.79	PŘÍPRAVY STANICE CHLAZENÍ VODY COOLING WATER PUMPING STATION	104,6	3,6*
1.80	PŘÍPRAVY STANICE OPLACH. VOD PUMPING STATION TO PWIP	48,5	3,6*
1.81	OKNOVÁ CHOBOA ESCAPE CORRIDOR	7,8	2,5

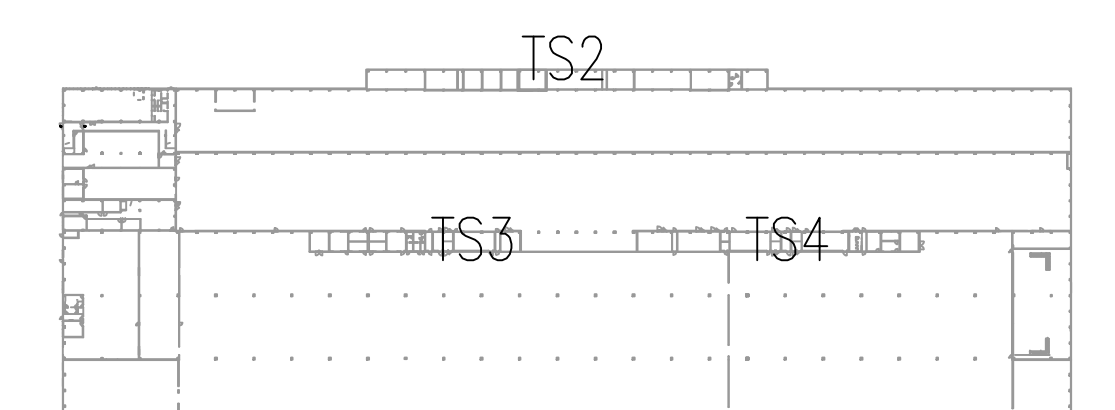
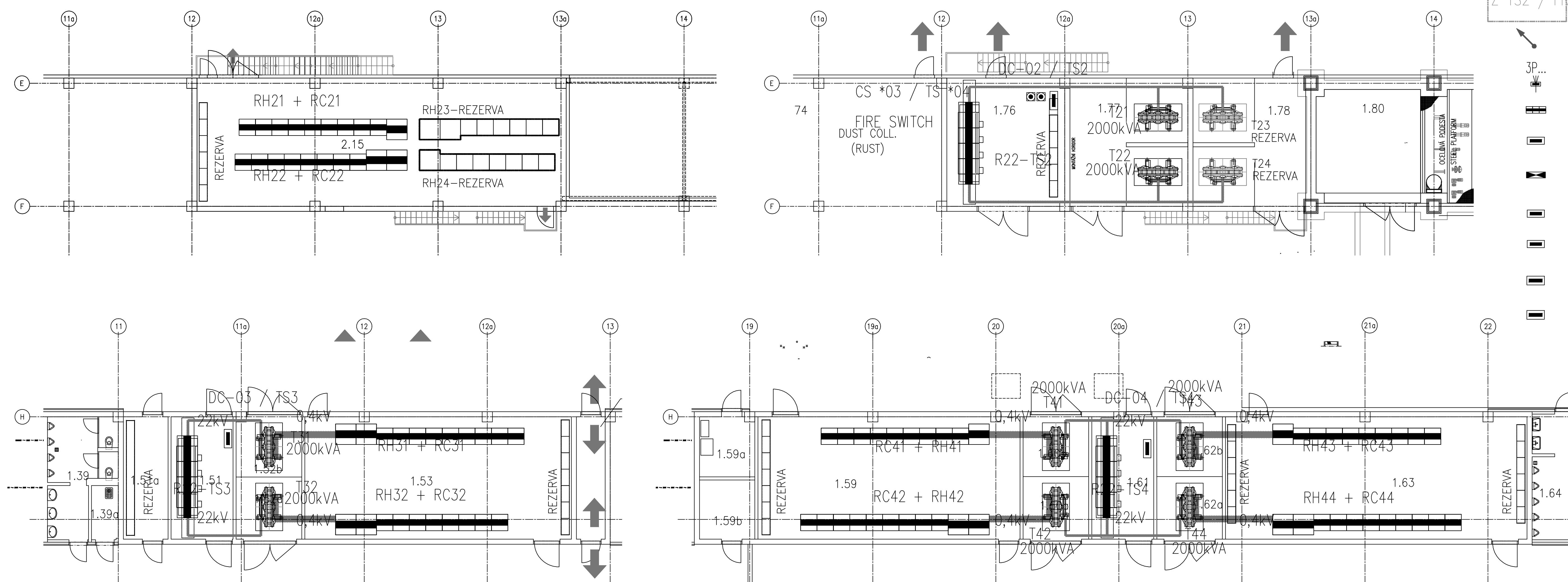
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling-Height
1.82	SKLAD NÁHRADNÍCH DÍLŮ SPARE PARTS STORAGE	51,9	3,6*
1.83	ROZVADEČ VN HV SUBSTATION	110,9	3,6*
1.84	PRAČOVNÍ FILTRY DUST COLLECTOR	72,9	7,5*
1.85	WC MUŽI TOILET MALE	13,2	2,5
1.86	WC ŽENY TOILET FEMALE	5,0	2,5
1.87	OKLADOVÁ KOMBINA	3,6	2,5
1.88	DENNÍ MÍSTNOST DAY ROOM	45,5	3,0
1.89	EXPEDICE FINAL EXPEDITION	721,1	5,3*
1.90	SKLAD ODPAZU (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*

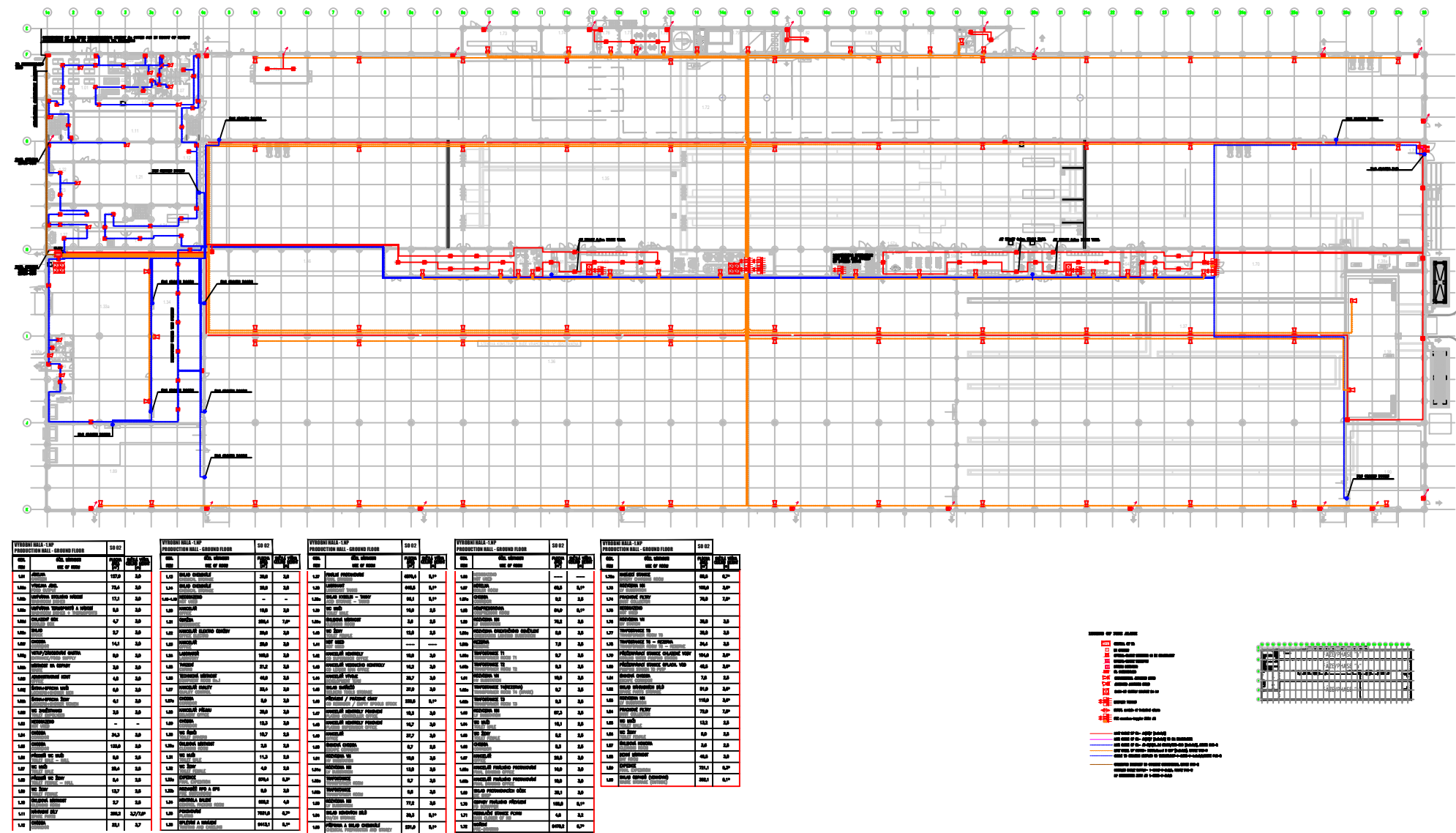
LEGENDA / LEGEND

- KABELOVÉ LÁVKY, ŽLABY - PROVOZNÍ NÁPÁJENÍ CABLE TRAYS, THROUGHS - OPERATION SUPPLY
- ===== KABELOVÉ LÁVKY, ŽLABY S FUNKČNOSTÍ PŘI POŽÁRU CABLE TRAYS, THROUGHS WITH FUNCTION IN FIRE
- PŘÍPOJNICOVÝ NÁPÁJECÍ SYSTÉM 3x400V / 630-800A BUSBARS SUPPLY SYSTEM 3x400V / 630-800A
- HRANICE NÁPÁJENÍ SWITCHBOARDS LIMIT
- KABELOVÁ STOUPAČKA CABLE RISER
- 3F VÝVOD 3 PHASE OUTLET
- RHx - HLAVNÍ ROZVADEČ RHx - MAIN SWITCHBOARD
- RPO - POŽÁRNÍ ROZVADEČ RPO - SWITCHBOARD OF FIRE SAFETY
- RK-x - KABELOVÝ ROZVADEČ RK-x - CABLE SWITCHBOARD
- RS-x - SVĚTELNÝ ROZVADEČ RS-x - LIGHTING PANEL
- R-UPSx - ROZVADEČ NOUZOVÉHO OSVĚTLENÍ R-UPSx - EMERGENCY LIGHTING SWITCHBOARD
- RKT - ROZVADEČ KOMPRESORU RKT - SWITCHBOARD OF COMPRESSOR
- Bax - ROZVADEČ MĚŘENÍ A REGULACE, DODÁVKA MĚŘ. Bax - SWITCHBOARD INSTRUMENTATION AND CONTROL, DELIVERY OF I&C

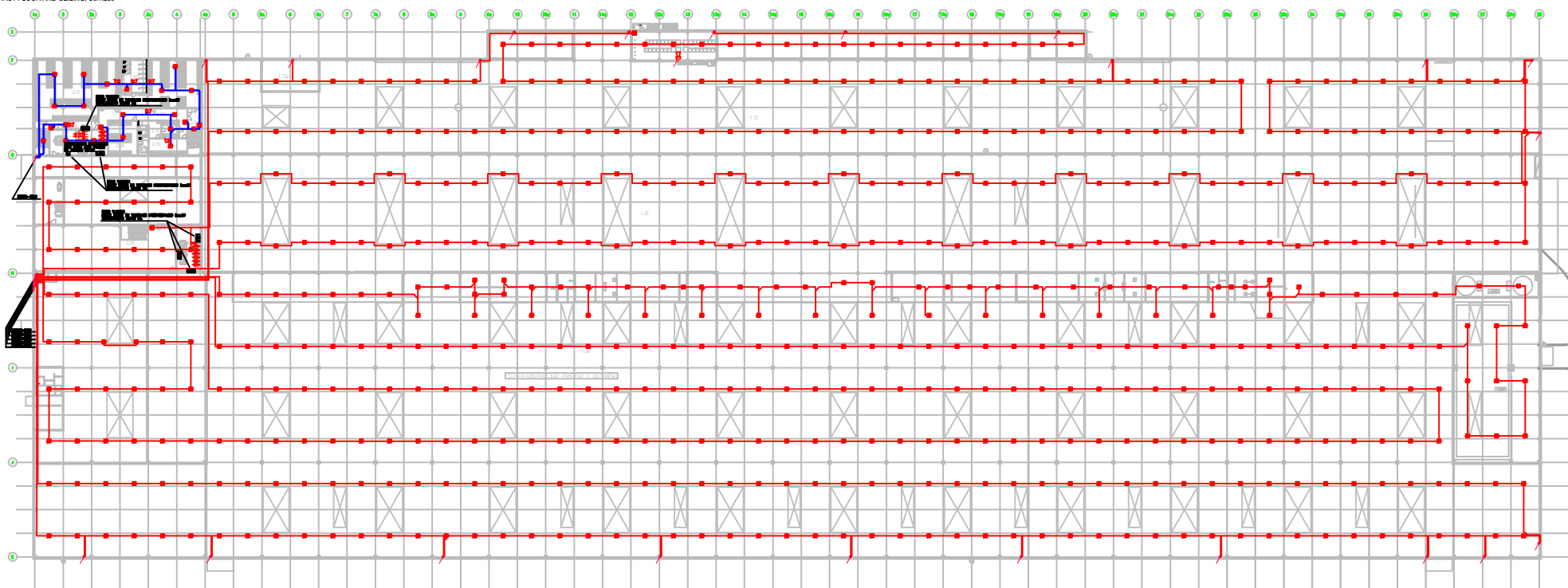


2.20	SKLAD PRO LABORATOR STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

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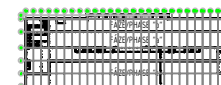
FIRST FLOOR AND CEILING, Sc.1:250

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2.25	BIŁAD PRO LABORATOR STROJOWE FOTOLABORATORY	200,1	3,3
2.26	STROJOWNIA WET Wet. Wrocław 2002	48,1	3,3

ENDING OF THE ALIAS

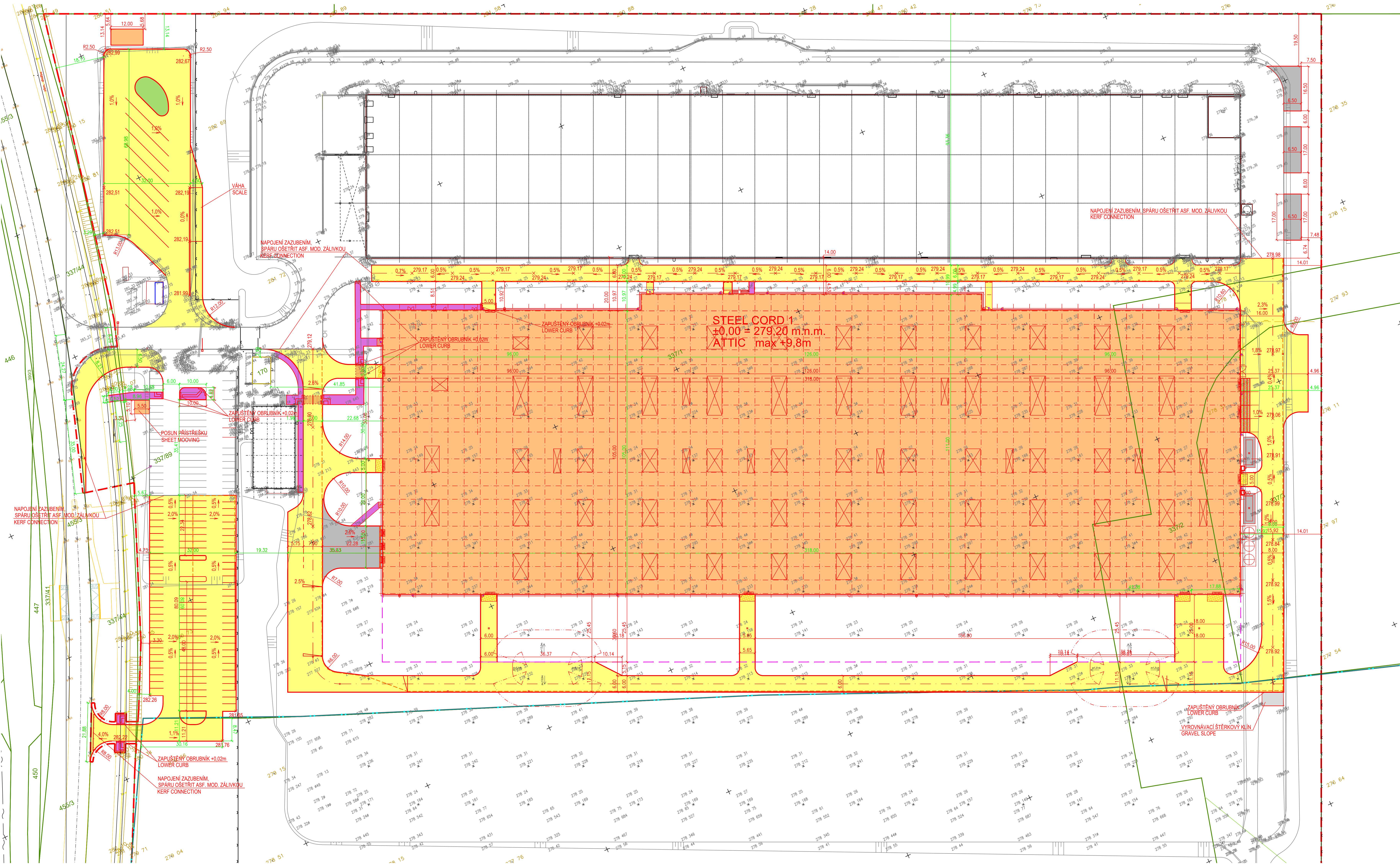
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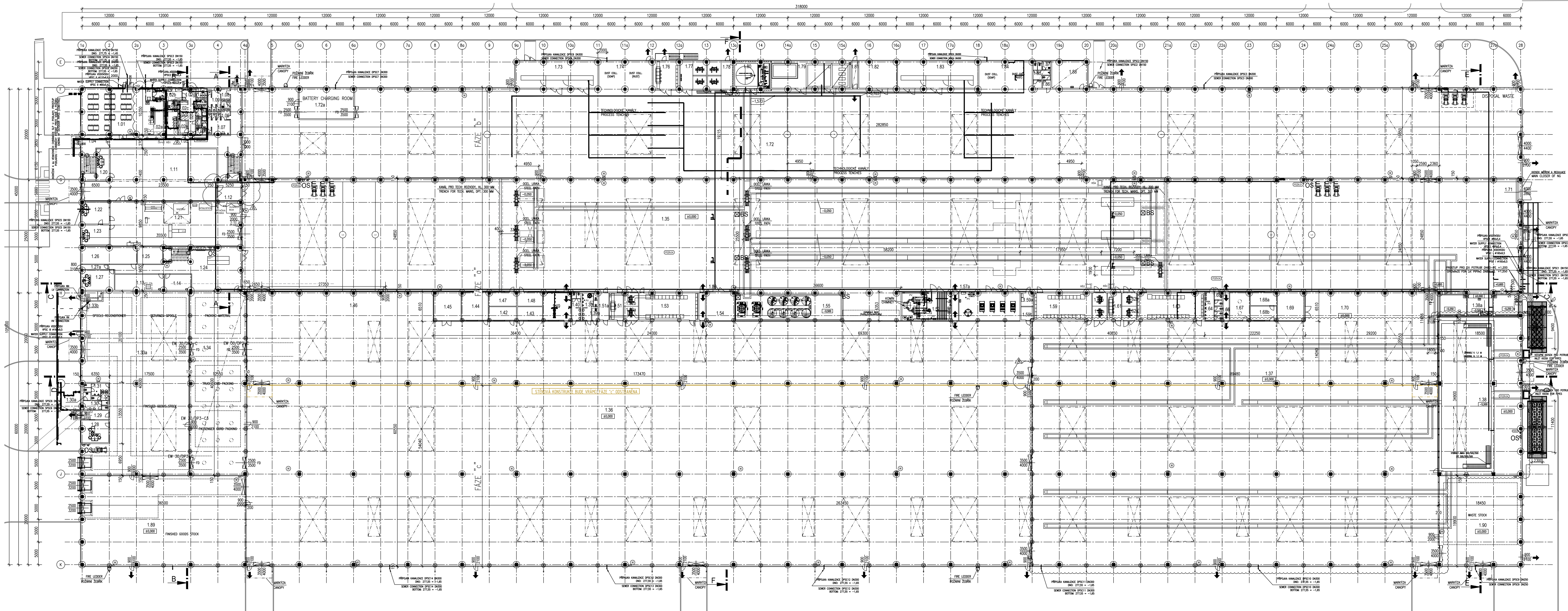


SITE LAYOUT 1:600

- LEGENDA / LEGEND
- ASFALTOVÁ KOMUNIKACE
ROAD WITH ASPHALT SURFACE
 - BETONOVÁ PLOCHA
AREA WITH CONCRETE SURFACE
 - STĚRK
GRAVEL
 - BUDOVY
BUILDINGS
 - ZAŠTŘEŠENÉ PLOCHY
COVERAGE AREA
 - CHODNÍKY
PAVEMENT
- CÍZÍ PROJEKT / DIFFERENT PROJECT

- OBJEKTOVÁ SOUSTAVA / LIST OF OBJECTS :
- STAVEBNÍ OBJEKTY / BUILDING OBJECTS
- SO 01 HALA BW / BEAD WIRE
 - SO 02 HALA SC / STEEL CORD
 - SO 02.1A HALA SC I. ETAPA - 1 FÁZE / SC PHASE I - PART 1
 - SO 02.1B HALA SC I. ETAPA - 2 FÁZE / SC PHASE I - PART 2
 - SO 02.1C HALA SC I. ETAPA - 3 FÁZE / SC PHASE I - PART 3
 - SO 02.3 Hala SC - Centrální šatny / Central Lockers
 - SO 03 ADMINISTRATIVNÍ BUDOVA / OFFICE BUILDING
 - SO 04 VRATNICE / GUARDHOUSE
 - SO 05 OPLOČENÍ / FENCING
 - SO 06 PŘÍSTŘEŠEK PRO KOLA A MOPEDY / BICYCLES SHED
 - SO 07 KIOSEK PLYNU / GAS MEASUREMENT
 - SO 08 VLAČKOVÉ POLE / FLAGS YARD
 - SO 09 ZALOŽNÍ ZDROJ / BACKUP POWER
- INŽENÝRSKÉ OBJEKTY / ENGINEERING OBJECTS
- IO 21 HRUBÉ TERÉNNÍ ÚPRAVY - ŘEŠENY SAMOSTATNÝM PROJEKTEM / GRADING WORKS - SOLUTION IN SEPARATE PROJECT
 - IO 22 KONEČNÉ TERÉNNÍ ÚPRAVY, SADOVÉ ÚPRAVY / LANDSCAPING
 - IO 23 KOMUNIKACE A ZPEVNĚNÉ PLOCHY / ROADS
 - IO 23.1 KOMUNIKACE, ZPEVNĚNÉ PLOCHY I. ETAPA / ROADS, PAVED AREAS I. PHASE
 - IO 23.2 KOMUNIKACE, ZPEVNĚNÉ PLOCHY II. ETAPA / ROADS, PAVED AREAS II. PHASE
 - IO 23.3 KOMUNIKACE, ZPEVNĚNÉ PLOCHY III. ETAPA / ROADS, PAVED AREAS III. PHASE
 - IO 24 VODNÍ HOSPODÁŘSTVÍ / WATER MANAGEMENT
 - IO 24.1 VODOVOD PITNÝ / POTABLE WATER DISTRIBUTION
 - IO 24.1.1 VODOVOD PITNÝ I. ETAPA / POTABLE WATER DISTRIBUTION I. PHASE
 - IO 24.1.2 VODOVOD PITNÝ II. ETAPA / POTABLE WATER DISTRIBUTION II. PHASE
 - IO 24.1.3 VODOVOD PITNÝ III. ETAPA / POTABLE WATER DISTRIBUTION III. PHASE
 - IO 24.2 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ / UTILITY AND FIRE WATER DISTRIBUTION
 - IO 24.2.1 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ I. ETAPA / UTILITY AND FIRE WATER DISTRIBUTION I. PHASE
 - IO 24.2.2 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ II. ETAPA / UTILITY AND FIRE WATER DISTRIBUTION II. PHASE
 - IO 24.2.3 VODOVOD ÚŽITKOVÝ A POŽÁRNÍ III. ETAPA / UTILITY AND FIRE WATER DISTRIBUTION III. PHASE
 - IO 24.3 KANALIZACE SPLAŠKOVÁ / WASTE WATER SEWAGE
 - IO 24.3.1 KANALIZACE SPLAŠKOVÁ I. ETAPA / WASTE WATER SEWAGE I. PHASE
 - IO 24.3.2 KANALIZACE SPLAŠKOVÁ II. ETAPA / WASTE WATER SEWAGE II. PHASE
 - IO 24.3.3 KANALIZACE SPLAŠKOVÁ III. ETAPA / WASTE WATER SEWAGE III. PHASE
 - IO 24.4 KANALIZACE DEŠŤOVÁ / RAIN WATER SEWAGE
 - IO 24.4.1 KANALIZACE DEŠŤOVÁ I. ETAPA / RAIN WATER SEWAGE I. PHASE
 - IO 24.4.2 KANALIZACE DEŠŤOVÁ II. ETAPA / RAIN WATER SEWAGE II. PHASE
 - IO 24.4.3 KANALIZACE DEŠŤOVÁ III. ETAPA / RAIN WATER SEWAGE III. PHASE
 - IO 24.5 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ / ROADS AND PAVED AREAS DRAINAGE
 - IO 24.5.1 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ I. ETAPA / ROADS AND PAVED AREAS DRAINAGE I. PHASE
 - IO 24.5.2 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ II. ETAPA / ROADS AND PAVED AREAS DRAINAGE II. PHASE
 - IO 24.5.3 ODVODNĚNÍ ZPEVNĚNÝCH PLOCH A KOMUNIKACÍ III. ETAPA / ROADS AND PAVED AREAS DRAINAGE III. PHASE
 - IO 24.6 RETENČNÍ NÁDRŽ / RETENTION TANK
 - IO 24.6.1 RETENČNÍ NÁDRŽ I. ETAPA / RETENTION TANK I. PHASE
 - IO 24.6.2 RETENČNÍ NÁDRŽ II. ETAPA / RETENTION TANK II. PHASE
 - IO 24.7 VÝTLAK VYČIŠŤENÝCH PRŮMYSLOVÝCH VODŮ / DELIVERY OF CLEANED INDUSTRIAL WATER
 - IO 25 VNĚJŠÍ ELEKTRICKÉ ROZVODY / EXTERNAL POWER DISTRIBUTION
 - IO 25.1 PŘÍPOJKA ELEKTRICKÉ ENERGIE VN / INCOMING LINE MV
 - IO 25.1.1 VSTUPNÍ SPÍNAČI STANICE VN R22.1 - I. ETAPA / INCOMING SUBSTATION HV 22kV I. PHASE
 - IO 25.1.2 VSTUPNÍ SPÍNAČI STANICE VN R22.1 - II. A III. ETAPA / INCOMING SUBSTATION HV 22kV II. AND III. PHASE
 - IO 25.1.3 PŘÍPOJKA VN 22 kV, I. A II. ETAPA / CONNECTION LINE HV 22 kV I. AND II. PHASE
 - IO 25.2 AREÁLOVÉ SILNOPRŮBUDÉ ROZVODY VN / EXTERNAL POWER SUPPLY MV
 - IO 25.2.1 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY VN 22kV I. ETAPA / EXTERNAL POWER SUPPLY MV 22kV I. PHASE
 - IO 25.2.2 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY VN 22 kV II. A III. ETAPA / EXTERNAL POWER SUPPLY MV 22kV II. AND III. PHASE
 - IO 25.3 AREÁLOVÉ SILNOPRŮBUDÉ ROZVODY NN / EXTERNAL POWER SUPPLY LV
 - IO 25.3.1 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY NN 0.4kV I. ETAPA / EXTERNAL POWER SUPPLY LV 0.4kV I. PHASE
 - IO 25.3.2 VENKOVNÍ SILNOPRŮBUDÉ ROZVODY NN 0.4kV II. A III. ETAPA / EXTERNAL POWER SUPPLY LV 0.4kV II. AND III. PHASE
 - IO 25.4 AREÁLOVÉ VENKOVNÍ OSVĚTLENÍ / EXTERNAL LIGHTING
 - IO 25.4.1 VENKOVNÍ OSVĚTLENÍ I. ETAPA / EXTERNAL LIGHTING I. PHASE
 - IO 25.4.2 VENKOVNÍ OSVĚTLENÍ II. A III. ETAPA / EXTERNAL LIGHTING II. AND III. PHASE
 - IO 26 VNĚJŠÍ SLABOPRŮBUDÉ ROZVODY / EXTERNAL COMMUNICATIONS
 - IO 26.1 PŘÍPOJKA SLABOPRŮBUDY / COMMUNICATIONS CONNECTION
 - IO 26.2 AREÁLOVÉ ROZVODY SLABOPRŮBUDY / COMMUNICATIONS DISTRIBUTION
 - IO 27 VNĚJŠÍ ROZVODY ZEEMNÍHO PLYNU / EXTERNAL GAS
 - IO 27.1 PŘÍPOJKA PLYNU / GAS CONNECTION
 - IO 27.2 AREÁLOVÉ ROZVODY PLYNU / GAS DISTRIBUTION





VÝROBNÍ HALA - 1NP		SO 02
PRODUCTION HALL - GROUND FLOOR		
CON. ITEM	ČÍSLO MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]
1.01	JÍDELNA CATERING	127,9 3,0
1.02a	VÝVLÁČKA JÍDEL FOOD OUTPUT	73,4 3,0
1.02b	UMÝVÁRNA STOLNÍHO NÁDOBI WASHROOM DISHES	17,1 3,0
1.02c	UMÝVÁRNA TERMOPODÍ A NÁDOBÍ WASHROOM DISHES + THERMOPODS	4,6 3,0
1.03	CHLÁZENÝ BOX COOLED BOX	4,3 3,0
1.02a	CHODBA CORRIDOR	6,6 3,0
1.02f	CHODBA CORRIDOR	10,0 3,0
1.02g	VSTUP/ZÁSOBOVÁNÍ GASTRA ENTRANCE/FOOD SUPPLY	8,8 3,0
1.02h	MÍSTNOST NA ODPAKY WASTE	4,0 3,0
1.03	ADMINISTRATIVNÍ KOUT OFFICE	8,8 3,0
1.02	SATNA+SPROCHA MUŽI LOCKERS+SHOWER MEN	6,0 3,0
1.02	SATNA+SPROCHA ŽENY LOCKERS+SHOWER WOMEN	6,1 3,0
1.03	WC ZAMĚSTNANCŮ TOILET EMPLOYEES	3,5 3,0
1.03	NEOSAZENO NOT USED	– –
1.04	CHODBA CORRIDOR	34,3 3,0
1.05	CHODBA CORRIDOR	133,0 3,0
1.06	PŘEDSÍŇ WC MUŽI TOILET MALE - HALL	5,0 2,5
1.07	WC MUŽI TOILET MALE	20,4 2,5
1.08	PŘEDSÍŇ WC ŽENY TOILET FEMALE - HALL	5,4 2,5
1.09	WC ŽENY TOILET FEMALE	13,7 2,5

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR		S0 02	
ČÍSLO ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	SVĚTLÁ VÝŠKA CEILING HEIGHT [m]
1.10	OKŘÍDKOVÁ MÍSTNOST CLEANING ROOM	2,7	2,5
1.11	NÁHROBNÍ DÍLY SPARE PARTS	295,2	3,7/3,6*
1.12	OKŘIDLO CORRIDOR	22,1	3,7
1.13	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	36,8	3,8
1.14	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	20,9	3,8
1.15-1.19	NEOSAZENO NOT USED	–	–
1.20	KANCELÁŘ OFFICE	19,8	3,0
1.21	GORŽIZBA DRESSING	285,4	7,6*
1.22	KANCELÁŘ ELEKTRO ODRÁŽBY ELECTRO OFFICE	29,6	3,0
1.23	KANCELÁŘ OFFICE	28,0	3,0
1.24	LABORATOR LABORATORY	160,5	3,0
1.25	TRŽENÍ CURING	21,2	3,5
1.26	TECHNICKÁ MÍSTNOST EQUIPMENT ROOM No.1	46,9	3,5
1.27	KANCELÁŘ KVALITY QUALITY CONTROL	33,4	3,0
1.27a	CHODBA CORRIDOR	5,9	3,0
1.28	KANCELÁŘ PŘÍJMU DELIVERY OFFICE	30,0	3,0
1.29	CHODBA CORRIDOR	12,3	3,0
1.30	WC ŘÍDÍČI TOILET DRIVERS	2,8	2,5
1.30a	OKŘÍDKOVÁ MÍSTNOST CLEANING ROOM	10,7	2,5
1.31	WC MUŽI TOILET MALE	11,3	2,5

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR			S0 02
QZN	QČL MÍSTNOSTI USE OF ROOM	POCITA AREA (m ²)	SVĚTLA VÝŠKA CEILING HEIGHT
1.32	WC ŽENY TOILET FEMALE	4,9	2,5
1.33a	EXPEDIENCE FINAL EXPEDITION	870,4	5,3*
1.33b	ROZVÁDĚČ RŮŽNÉ EPS FIRE SWITCHROOM	9,0	3,0
1.34	KONTROLA BALENÍ CONTROL PACKING ROOM	508,2	4,0
1.35	POKROČILÉ PLATING	7031,5	6,7*
1.36	SPLETÁNÍ A NAVÁZÍ SPINNING AND CABELING	9413,1	5,1*
1.37	FRÁZÍ PROTAHOVÁNÍ FILM DRAWING	4870,4	5,1*
1.38	LUBRIKANT LUBRICANT TANKS	645,5	5,1*
1.39a	TANKY KYSLEČNÝ - TANNU ACID STORAGE - TANKS	96,1	5,1*
1.39b	WC MUŽI TOILET MALE	16,9	2,5
1.39c	ODHLAŽOVÁ MÍSTNOST CLEANING ROOM	3,6	2,5
1.40	WC ŽENY TOILET FEMALE	12,0	2,5
1.41	NOT USED	---	---
1.42	KANCELÁŘ KONTROLY QC SUPERVISOR OFFICE	18,0	3,0
1.43	KANCELÁŘ VEDOUČHO KONTROLY QC LEADER MAN OFFICE	16,2	3,0
1.44	KANCELÁŘ VÝVOJE DEVELOPMENT TEAM	35,7	3,0
1.45	SKLAD SVAŘENÍ WELDERS TOOLS STORAGE	37,9	3,0
1.46	PRŮVĚNY / PRAZDINE QWY QC REVISER / EMPTY SPOKE STOCK	232,5	5,1*
1.47	KANCELÁŘ KONTROLY POKOVENÍ FINISHING SUPERVISOR OFFICE	18,3	3,0
1.48	KANCELÁŘ KONTROLY POKOVENÍ FINISHING SUPERVISOR OFFICE	16,7	3,0

VÝROBNÍ HALA - 1NP		S0 02	
PRODUCTION HALL - GROUND FLOOR			
QZM	QZM NOSTNOSTI USE OF ROOM	POCITA M ²	SVĚTLA VÝŠKA CEILING HEIGHT
1.49	KANCELARIE OFFICE	37,7	3,0
1.50	OKNAKVI CHODBA EASC CORRIDOR	8,7	2,5
1.51	ROZVOJNA NV HV SUBSTATION	18,0	3,5
1.51a	ROZVOJNA NV LV SUBSTATION	13,0	3,5
1.52a	TRANSFORMACE TRANSFORMER ROOM	9,7	3,5
1.52b	TRANSFORMACE TRANSFORMER ROOM	9,5	3,5
1.53	ROZVOJNA NV LV SUBSTATION	77,2	3,5
1.54	KUKA KOVŮCHÍ DÍLO QUEN STATION	39,3	5,1*
1.55	PŘÍPRAVA A KUKA CHEMICAL PREPARATION AND STOREY	23,9	5,1*
1.56	NEČISTAZNA NOT USE	----	----
1.57	KOTELNA BOLER ROOM	68,5	5,1*
1.57a	CHODBA CORRIDOR	9,2	2,5
1.58	KOMPRESOROVNA COMPRESSOR ROOM	84,9	5,1*
1.59	ROZVOJNA NV LV SUBSTATION	76,2	3,5
1.59a	ROZVOJNA GRENTAČNÍ OSVĚTLENÍ GRENTATION LIGHTING SUBSTATION	8,0	3,5
1.59b	REZERVA RESERVE	7,9	3,5
1.60a	TRANSFORMACE T1 TRANSFORMER ROOM T1	9,7	3,5
1.60b	TRANSFORMACE T2 TRANSFORMER ROOM T2	9,3	3,5
1.61	ROZVOJNA NV HV SUBSTATION	18,0	3,5
1.62	TRANSFORMACE (*REZERVA) TRANSFORMER ROOM T2 (*RESERVE)	9,7	3,5

VÝROBNÁ HAL - LNP PRODUCTION HALL - GROUND FLOOR			SO 02
QZN	QČL MIENOSI USE OF ROOM	POCMA AREA (m ²)	SVETLA VYSKA CEILING HEIGHT (m)
1.62b	TRANSFORMACE T3 TRANSFORMER ROOM T3	9,3	3,5
1.63	ROZVODNA VN LY SUBSTATION	87,3	3,5
1.64	WC MUŽI TOILET MALE	18,1	2,5
1.65	WC ŽENY TOILET FEMALE	5,2	2,5
1.66	CHODBA CORRIDOR	8,3	2,5
1.67	KANCELAR OFFICE	26,8	3,0
1.68a	KANCELAR FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	16,9	3,0
1.68b	KANCELAR FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	18,0	3,0
1.69	SKLOD PROTAHOVACÍCH ČEKŮ DIE SHOP	38,1	3,0
1.70	OPATY FINÁLNÍHO PŘEVĚRY TO SCHEMATS	150,0	5,1*
1.71	REGULAČNÍ STANICE PĚNU MIL CLOSER OF NG	4,5	3,2
1.72	HOŘENÍ PŘE-DRAWING	547,8	6,7*
1.72a	NÁSLUČI STANICE BATTERY CHARGING ROOM	80,5	6,7*
1.73	ROZVODNA VN LY SUBSTATION	108,6	3,6*
1.74	PRACHOVÉ FILTRY DUST COLLECTOR	76,0	7,5*
1.75	NEOBRÁZOVANÝ NOT USED		
1.76	ROZVODNA VN WY STATION	35,8	3,5
1.77	TRANSFORMACE T5 TRANSFORMER ROOM T5	35,8	3,5
1.78	TRANSFORMACE T6 - REZERVA TRANSFORMER ROOM T6 - RESERVE	34,4	3,5
1.79	PŘEDČERPAVACÍ STANICE, CHLAZENÍ VODY CIRCULATING WATER PUMPING STATION	104,6	3,6*

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR		\$0 02	
ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA (m²)	SVĚTLA VÝŠKA CEILING HEIGHT (m)
1.80	PŘÍMĚŠOVÁNÍ STAVBY OPRACH - VOD POUMĚŘOVÁNÍ STAVBY	48,5	3,6*
1.81	ÚNIKOVÁ CHODINA ESCAPE CORRIDOR	7,8	2,5
1.82	SKLAD NÁŘADNÍKŮ SPARE PARTS STORAGE	51,9	3,6*
1.83	PROVEDNĚNÍ LV LV SUBSTATION	110,9	3,6*
1.84	PRAČÍHOVÉ FILTRY DUST COLLECTOR	72,9	7,5*
1.85	WC MUŽI TOILET MALE	13,2	2,5
1.86	WC ŽENY TOILET FEMALE	5,0	2,5
1.87	OKENOVÁ KOMORA CLEANING ROOM	3,6	2,5
1.88	DEŽNÍ MÍSTNOST DUST ROOM	45,5	3,0
1.89	EXPEDIENCE FUEL EXPEDITION	721,1	5,3*
1.90	SKLAD ODPADŮ (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*

LEGENDA HMOT
MATERIAL LIST:

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR		\$0 02	
ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	POCITA PLOCHA AREA (m²)	SVĚTLA VÝŠKA CEILING HEIGHT (m)
1.80	PŘÍMĚŠOVÁNÍ STAVBY OPRACH - VOD POUMĚŘOVÁNÍ STAVBY	48,5	3,6*
1.81	ÚNIKOVÁ CHODINA ESCAPE CORRIDOR	7,8	2,5
1.82	SKLAD NÁŘADNÍKŮ SPARE PARTS STORAGE	51,9	3,6*
1.83	PROVEDNĚNÍ LV LV SUBSTATION	110,9	3,6*
1.84	PRAČÍHOVÉ FILTRY DUST COLLECTOR	72,9	7,5*
1.85	WC MUŽI TOILET MALE	13,2	2,5
1.86	WC ŽENY TOILET FEMALE	5,0	2,5
1.87	OKENOVÁ KOMORA CLEANING ROOM	3,6	2,5
1.88	DEŽNÍ MÍSTNOST DUST ROOM	45,5	3,0
1.89	EXPEDIENCE PART EXPEDITION	721,1	5,3*
1.90	SKLAD ODPADŮ (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*

POZNÁMKA / NOTE:

- POPIS SKLADBY KONSTRUKCÍ-VIZ 0045-102-43/1181 001
- DETAILS OF STRUCTURE-SEE DRAWING 0045-102-43/1181 001

BS BEZPEČNOSTNÍ SPRCHA
EMERGENCY SHOWER

Jx JÍMKA
SUMP

PV POOLÁHOVÁ VPÚŠT'
FLOOR OUTLET

ČZ ČISTIČI ROHOŽE (VENKOVNÍ I VNITŘNÍ)
CLEAN MATS (EXTERNAL AND INTERIOR)

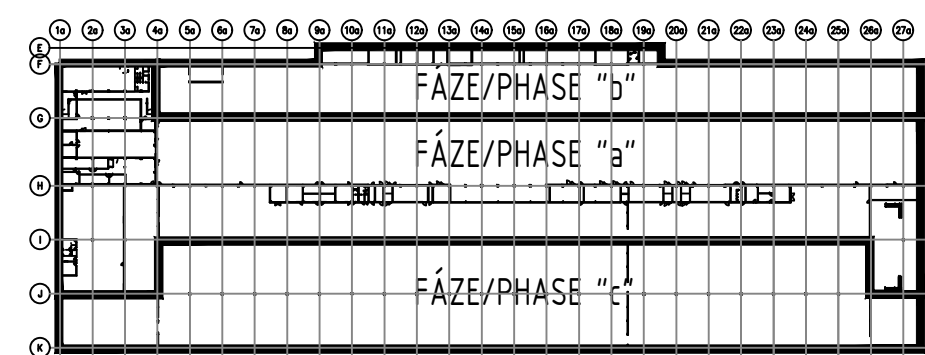
OS OČNÍ SPRCHA
EYE SHOWER

REVIZIJA: SACHTA 800x1000mm, PLATNOSTI: PORLOP
600x900mm, STENA TL. 250mm, STUPADLA DNO DLE
PROJEKTU KANALIZACE - CELKEM 4 ks
MANHOLES 800x1000mm, GAS-TIGHT HATCH 600x900
WALL THICKNESS 250mm + STEPS. BOTTOM ACC. TO
SYSTEM PROJECT - TOTAL 3 ks

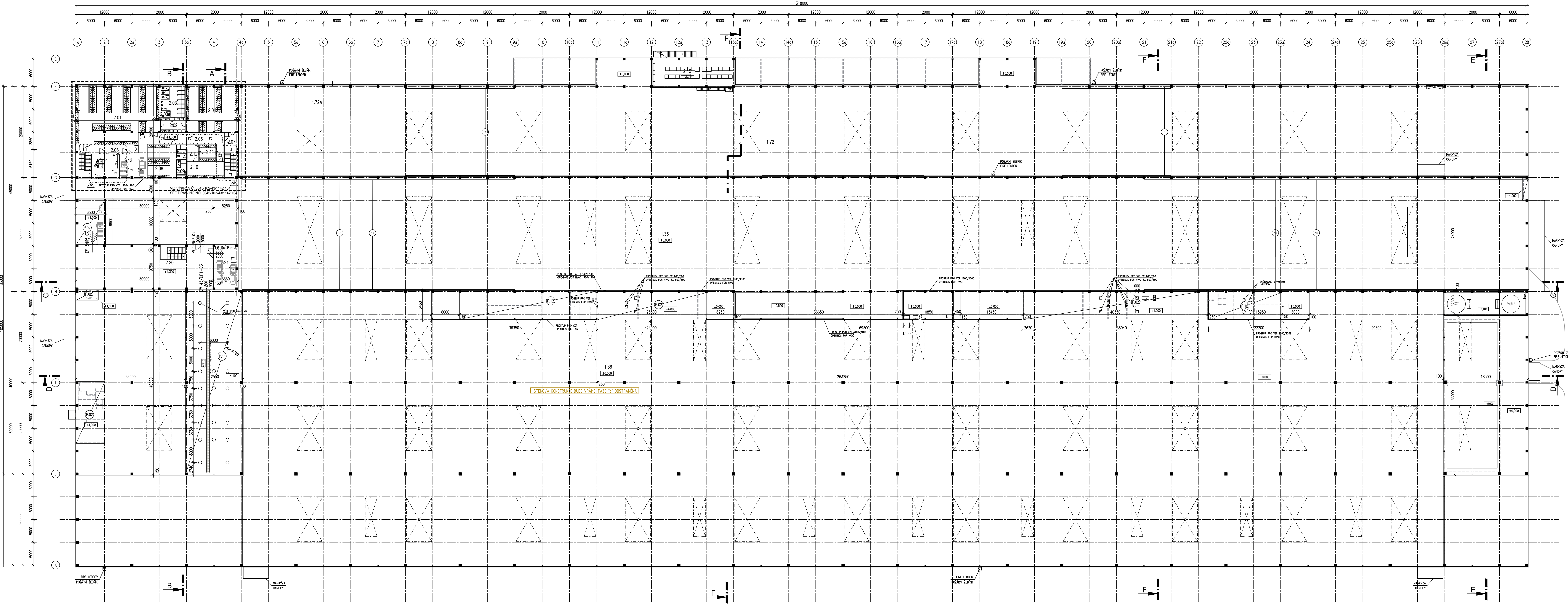
<u>DZN</u>	<u>HLOUBKA DNA/BOTTOM</u>	<u>STUPADLA/STEPS</u>
R51	-1,150 m	3 ks/pcs
R52	-2,200 m	7 ks/pcs
R53	-2,200 m	7 ks/pcs
R54	-3,570 m	11 ks/pcs

$$\begin{array}{lll} \text{III} & -\alpha_1\alpha^2/\alpha & \text{II} \\ \text{IV} & \alpha_0/\beta\alpha^2 & \end{array}$$

POZNÁMKA / NOTE

[illegible]

PŮDORYS 1.NP, M 1:250 / LAYOUT OF GROUND FLOOR, Sc:1:250



VÝROBNÍ HALA - 2.NP PRODUCTION HALL - FIRST FLOOR			SO 02
OZN. ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	SVĚTLÁ VÝŠKA CEILING HEIGHT [m]
2.01	SÁTKY MUŽI LOCKERS MEN	223,7	3,0
2.02	UMÝVADOVÁ PŘEDÍR MEN – SINK ANTE-ROOM	16,4	3,0
2.03	SPRCHY + WC SHOWERS + TOILETS MEN	33,6	2,5
2.03a	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,6	2,5
2.04	SÁTKY ŽENY LOCKERS WOMEN	116,6	3,0
2.05	CHODBA CORRIDOR	55,5	3,0
2.06	CHODBA CORRIDOR	42,6	3,0
2.07	CHODBA CORRIDOR	29,1	3,0
2.08	SÁTKY ŽENY LOCKERS WOMEN	44,3	3,0
2.09	SPRCHY + WC ŽENY SHOWERS + TOILETS WOMEN	7,3	3,0
2.10	HYGIENICKÁ SÁTKA MUŽI HYGIENIC LOCKERS MEN	28,0	3,0
2.11	ČISTÁ SÁTKA MUŽI HYGIENIC LOCKERS MEN	13,0	3,0
2.12	SPRCHY + WC SHOWERS + TOILETS MEN	15,1	2,5
2.13	STROJOVNA VZT HVAC TECHNICAL AREA	32,2	3,3*
2.14	KOTLOVNA BOILER ROOM	31,7	3,3*
2.15	ROZVODNA NN LV SUBSTATION	111,4	3,5*

2.20	SKLAD PRO LABORATOR STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

SKLADBA STŘEŠNÍHO PLÁŠTĚ:
ROOF COMPOSITION:

- 5.01 STŘEŠNÍ HYDROIZOLAČNÍ FOLIE
ROOF WATERPROOFING MEMBRANE
- 5.02 TRAPEZOVÝ STŘEŠNÍ PLECH
PROFILED SHEET
- 5.03 TRAPEZOVÝ STŘEŠNÍ PLECH
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SKLADBA PODLAHY:
FLOOR COMPOSITION:

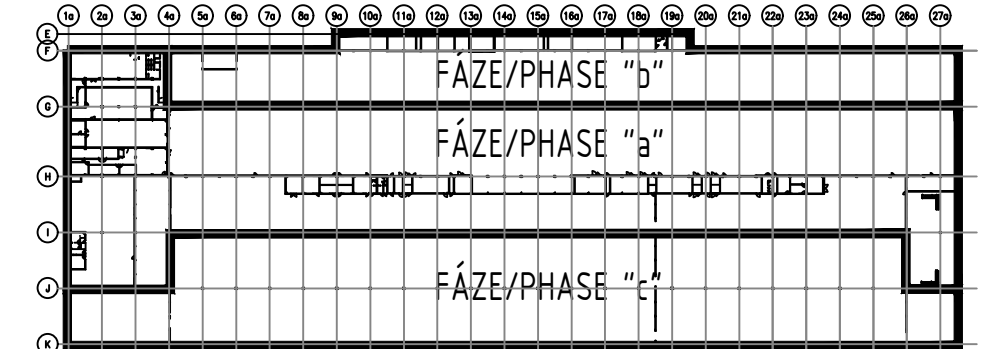
- 6.01 NÁSLAPNÁ VRSTVA DLE MÍSTNOSTI
FLOOR FINISHING ACC. TO ROOM
- 6.02 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.76 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.77 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.78 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.79 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.80 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.81 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.82 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.83 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.84 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.85 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.86 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.87 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.88 TRAPEZOVÝ PLECH S KARI SÍTÍ
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- 6.90 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.91 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.92 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.93 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.94 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.95 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.96 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.97 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.98 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 6.99 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID
- 7.00 TRAPEZOVÝ PLECH S KARI SÍTÍ
TRAPEZOID SHEET WITH STEEL GRID

LEGENDA HMOT:
MATERIAL LIST:

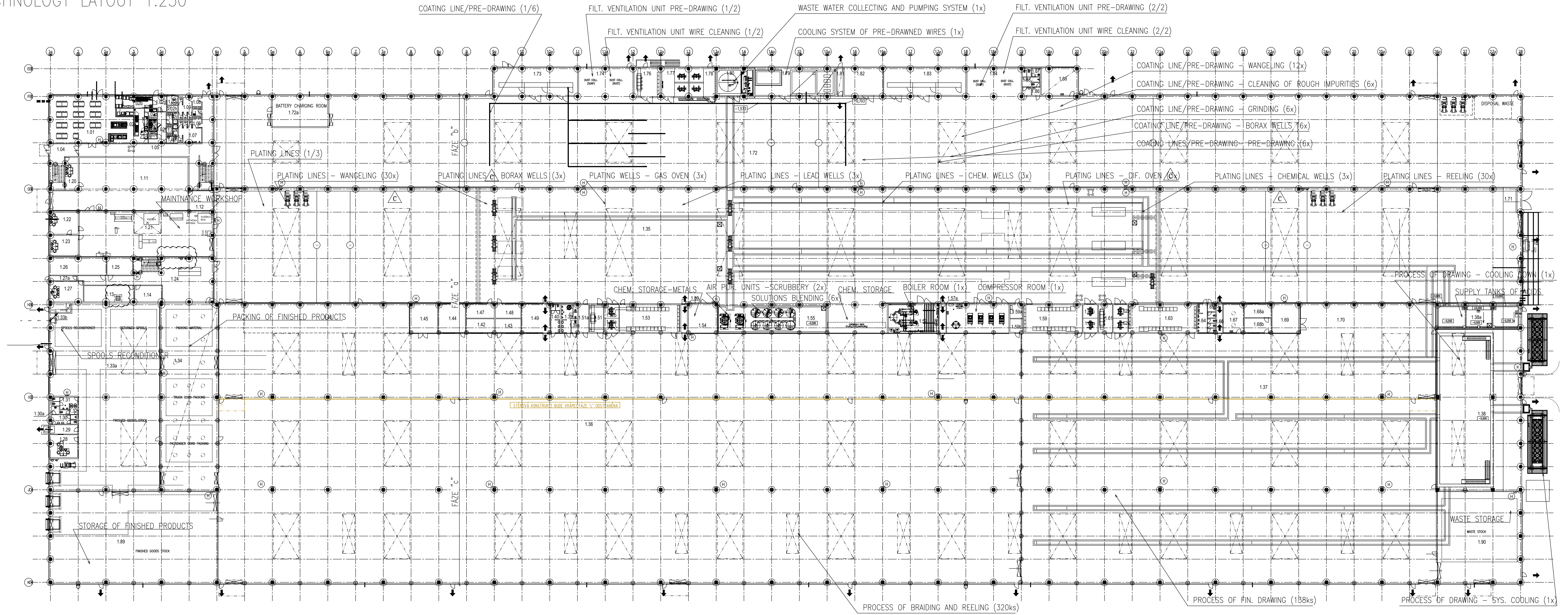
- TEPELNĚ IZOLAČNÍ SANDWICH PANELE TL.150mm; SH. +2,150m
THERMAL INSULATED SANDWICH PANEL TH.150mm; SH. +2,150m
- TRAPEZOVÝ PLECH S KARI SÍTÍ TL.150mm; SH. +2,150m
TRAPEZOID SHEET WITH STEEL GRID TH.150mm; SH. +2,150m
- KERAMICKÉ ŽALUZIE TL. 250mm
CERAMIC MASONRY TH. 250mm
- STŘEŠNÍ PLECH S KARI SÍTÍ TL. 150mm
TRAPEZOID SHEET WITH STEEL GRID TH. 150mm
- PLASTERBOARD WALL TH. 150mm

POZNÁMKA / NOTE:
- POPS SKLADBY KONSTRUKCÍ-VZ. 0045-102-43/1181 001
- DETAILS OF STRUCTURE-SEE DRAWING 0045-102-43/1181 001

- BS BEZPEČNOSTNÍ SPRCHA
EMERGENCY SHOWER
- JX JAMA
SUMP
- PV PODLAHOVÝ VÝST
FLOOR OUTLET
- ČZ ČISTÍ ROKOŽ (VENKOVNÍ I VITRINÍ)
CLEAN MATS (EXTERNAL AND INTERIOR)
- OS OČNÍ SPRCHA
EYE SHOWER
- RS14 REZERVNÍ SÁCHA 800x1000mm, RYBNÝŠKOVÝ POKLOP
600x900mm, STĚNA TL. 250mm, STUPAČKA DNO DLE
PROJEKTU KANALIZACE – CELDEM 4 ka
MANHOLES 800x1000mm, GAS-TIGHT HATCH 600x900mm
WALL THICKNESS 250mm + STEPS, BOTTOM ACC. TO SEWAGE
SYSTEM PROJECT – TOTAL 4 ka
- OZN. HLoubka dna/bottom – STUPAČKA/STEPS
- RS1 –1,150 m 3 ka/pcs
- RS2 –2,200 m 7 ka/pcs
- RS3 –2,000 m 7 ka/pcs
- RS4 –3,570 m 11 ka/pcs



TECHNOLOGY LAYOUT 1:250



PRODUCTION HALL - GROUND FLOOR	
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ITEM	USE OF ROOM	AREA	CILING HEIGHT
1.01	JEDILNA CANTEN	127.9	3.0
1.02a	VÝDEJNÁ JEDL FOOD SUPPLY	73.4	3.0
1.02b	UMÝVARNÁ STUHLNÉ NÁDOBÍ WASHROOM DISHES	17.1	3.0
1.02c	UMÝVARNÁ THERMOPOTI, A NÁDOBÍ WASHROOM DISHES + THERMOPOTS	5.5	3.0
1.02d	CHLAZENÝ BOX COOLED BOX	1.1	3.0
1.02e	SKLAD STOCK	2.7	3.0
1.02f	CHODBA CORRIDOR	14.1	3.0
1.02g	VSTUP/ZASOBARENÍ GASTRA ENTRANCES/FOOD SUPPLY	8.9	3.0
1.02h	MÍSTNOST NA ODPAKY WASTE	3.0	3.0
1.02i	ADMINISTRATIVNÍ KOUT OFFICE	4.8	3.0
1.02j	SÁLNÁ-SPRCHA MUŽI LOCKERS+SHOWER MEN	6.0	3.0
1.02k	SÁLNÁ-SPRCHA ŽENY LOCKERS+SHOWER WOMEN	6.1	3.0
1.02l	WC ZÁMĚSTNÁNCŮ TOILET EMPLOYEES	3.5	3.0
1.03	NEOBZÁVENO NOT USED	–	–
1.04	CHODBA CORRIDOR	34.3	3.0
1.05	CHODBA CORRIDOR	133.0	3.0
1.06	PŘÍDEJNÉ WC MUŽI TOILET MALE – HALL	5.0	2.5
1.07	WC MUŽI TOILET MALE	20.4	2.5
1.08	PŘÍDEJNÉ WC ŽENY TOILET FEMALE – HALL	5.4	2.5
1.09	WC ŽENY TOILET FEMALE	13.7	2.5

PRODUCTION HALL - GROUND FLOOR	
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ITEM	USE OF ROOM	AREA	Ceiling Height
1.10	GRADOVA MESTNOST CLEANING ROOM	2,7	2,5
1.11	NAPRAVNI DOLY SPARE PARTS	296,2	3,7/7,6*
1.12	CHOBOA CORRIDOR	22,1	3,7
1.13	SKLAD CHEMIKALIJ CHEMICAL STORAGE	38,8	3,8
1.14	SKLAD CHEMIKALIJ CHEMICAL STORAGE	20,9	3,8
1.15-1.19	NEOBŽIŽENO NOT USED	-	-
1.20	KANCELAR OFFICE	19,8	3,0
1.21	GORIŽNA MISTRESS	285,4	7,6*
1.22	KANCELAR ELEKTRO GORBYZY ELECTRO	29,6	3,0
1.23	KANCELAR OFFICE	28,0	3,0
1.24	LABORATOR LABORATORY	160,5	3,0
1.25	TVRZENI CURING	21,2	3,5
1.26	TEHNIČKA MESTNOST EQUIPMENT ROOM No.1	49,6	3,5
1.27	KANCELAR KVALITY QUALITY CONTROL	33,4	3,0
1.27a	CHOBOA CORRIDOR	5,9	3,0
1.28	KANCELAR PRÍJMU DELIVERY OFFICE	30,0	3,0
1.29	CHOBOA CORRIDOR	12,3	3,0
1.30	WC ŽENY TOILET LADIES	16,7	2,5
1.30a	GRADOVA MESTNOST CLEANING ROOM	2,8	2,5
1.31	WC MUŽI TOILET MALE	11,3	2,5

PRODUCTION HALL - GROUND FLOOR	
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ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.32	WC ŽENY TOILET FEMALE	4,9	2,5
1.33	EXPEDICE TINEL EXPEDITION	870,4	5,3*
1.33b	ROZVÁŽEČ BPO A EPS FIRE SWITCHROOM	8,0	3,0
1.34	KONTROLA, BALENÍ CONTROL, PACKING ROOM	508,2	4,0
1.35	POKOJOVÁNÍ PLATING	703,51	6,7*
1.36	STŘEŠNÍ A NÁVLÉTNÉ TYPING AND CABELING	9413,3	5,1*
1.37	FINANČNÍ PRŮVÁŽNÍ FINANCIAL DRAWING	4870,4	5,1*
1.38	LUBRIKANT LUBRICANT TANKS	645,5	5,1*
1.38a	SKLAD KYSELIN – TANKY ACID STORAGE – TANKS	96,1	5,1*
1.39	WC MUŽI TOILET MALE	16,9	2,5
1.39b	GRUPOVNÍ MÍSTNOST CLEANING ROOM	3,6	2,5
1.40	WC ŽENY TOILET FEMALE	12,0	2,5
1.41	NOT USED	---	---
1.42	NOT USED	---	---
1.43	KANCELAR CB SUPERVISOR OFFICE	18,0	3,0
1.43b	KANCELÁŘ VEDOUČÍHO KONTROLY CB LEADER MAN OFFICE	16,2	3,0
1.44	KANCELÁŘ VOJŇSKÉHO DEVELOPMENT TEAM	37,9	3,0
1.45	SKLAD SVÁŘECÍ WELDERS TOOLS STORAGE	35,7	3,0
1.46	PŘEVÝŠNÍ / PŘÍZEMNÍ ČIŠTÝ CB DOWNCAST / ELEVATOR SPILLS STOCK	232,5	5,1*
1.47	KANCELÁŘ KONTROLY POŽÁRŮ PLATING CONTROLLER OFFICE	18,3	3,0
1.48	KANCELÁŘ KONTROLY POŽÁRŮ PLATING SUPERVISOR OFFICE	16,7	3,0

PRODUCTION HALL - GROUND FLOOR	
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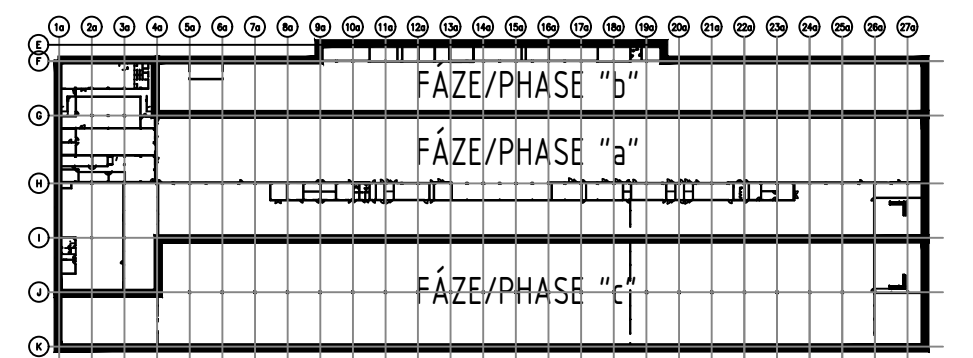
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.49	KANCELAR OFFICE	37,7	3,0
1.50	UNIKOVA CHODBA ESCAPE CORRIDOR	8,7	2,5
1.51	ROZDOVNÁ VN LV SUBSTATION	18,0	3,5
1.52	ROZDOVNÁ VN LV SUBSTATION	13,0	3,5
1.53a	TRANSFORMANCE TRANSFORMER ROOM	9,7	3,5
1.53b	TRANSFORMANCE TRANSFORMER ROOM	9,5	3,5
1.54	ROZDOVNÁ VN LV SUBSTATION	77,2	3,5
1.55	SKLAD KOVŮVŮRŮ DÍLO CUTTING STORE	39,3	5,1*
1.56	PŘÍPRAVA A SKLAD KEMIKÁLÍ CHEMICAL PREPARATION AND STOREY	231,9	5,1*
1.56	NEZDROŽENÝ NOT USED	---	---
1.57	KOTELNA BOILER ROOM	68,5	5,1*
1.57a	KORIDOR CORRIDOR	9,2	2,5
1.58	KOMPRESOROVNA COMPRESSOR ROOM	84,9	5,1*
1.59	ROZDOVNÁ VN LV SUBSTATION	76,2	3,5
1.59a	ROZDOVNÁ OHEBNÁŽENÍ OSVĚTLÉNÍ ORIENTATION LIGHTING SUBSTATION	8,0	3,5
1.59b	RESERVE	7,9	3,5
1.60a	TRANSFORMANCE T1 TRANSFORMER ROOM T1	9,7	3,5
1.60b	TRANSFORMANCE T2 TRANSFORMER ROOM T2	9,3	3,5
1.61	ROZDOVNÁ VN LV SUBSTATION	18,0	3,5
1.62	TRANSFORMANCE (TRAZERNA) TRANSFORMER ROOM T4 (TRAFER)	9,7	3,5

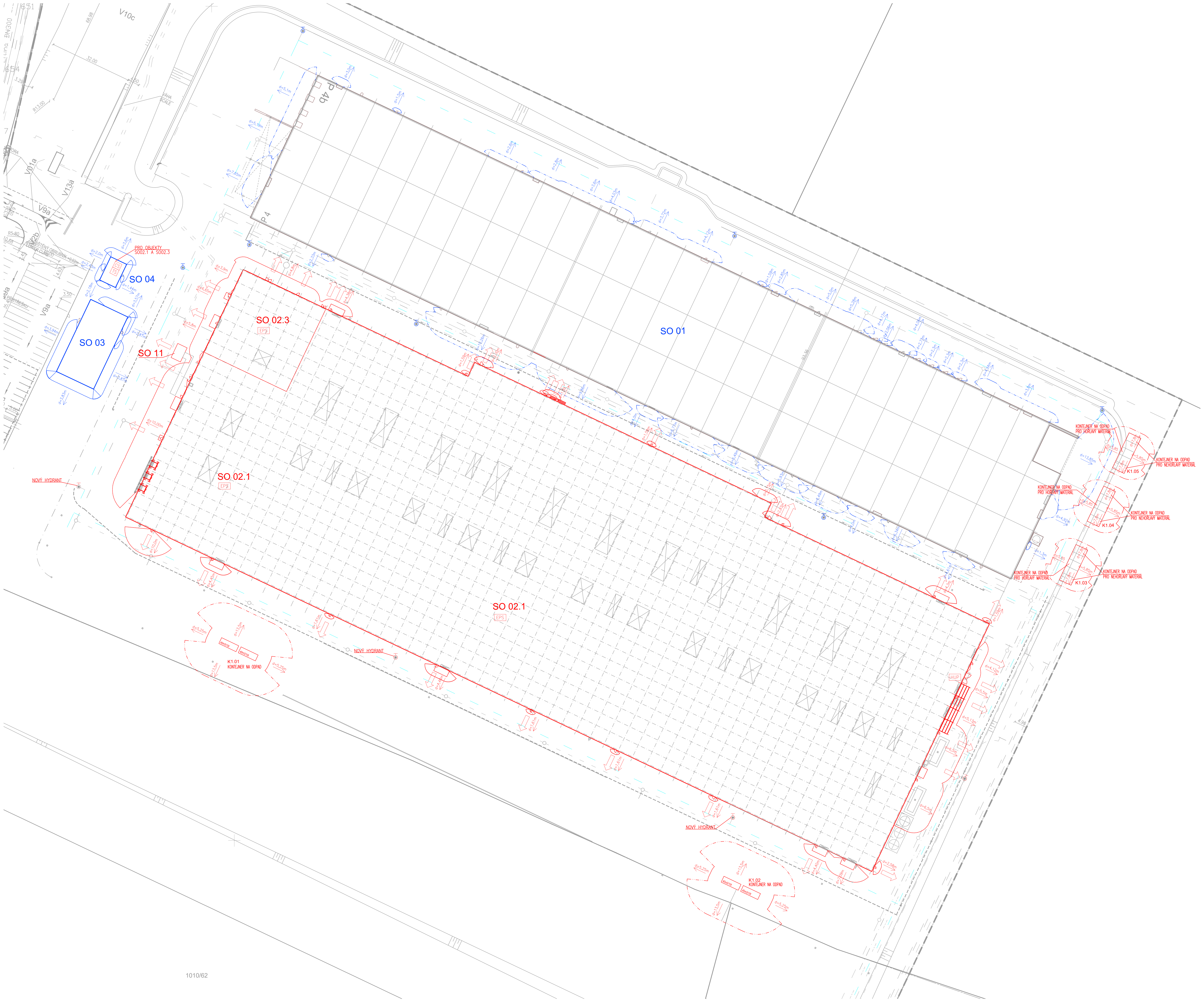
PRODUCTION HALL - GROUND FLOOR	
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ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.62b	TRANSFORMANCE T3	3,3	3,5
1.63	ROZVOJNA NN LV SUBSTATION	87,3	3,5
1.64	WC MUŽ TOILET MALE	18,1	2,5
1.65	WC ŽENY TOILET FEMALE	5,2	2,5
1.66	CHODBA CORRIDOR	8,3	2,5
1.67	KANCELARIE OFFICE	26,8	3,0
1.68a	KANCELARIA FINANČNÝ PROTAHOVÁNÍ FIN. DRAWING OFFICE	16,9	3,0
1.68b	KANCELARIA FINANČNÝ PROTAHOVÁNÍ FIN. DRAWING OFFICE	18,0	3,0
1.69	SKLAD PROTAHOVACÍ ODKAZ DE SHOP	38,1	3,0
1.70	ČISTÍCÍ STANCIJE PŘEVÝŠNÍ FD SUMPSTER	155,0	5,1*
1.71	REGULAČNÍ STANICE PŘEV. MAIN CLOSER OF PG	4,5	3,2
1.72	MŮŘENÍ PWR-DRAWING	5478,2	6,7*
1.72a	NAŘÍZOVACÍ STANICE BATTERY CHARGING ROOM	80,5	6,7*
1.73	ROZVOJNA NN LV SUBSTATION	108,6	3,6*
1.74	PRAČOVNĚ FILTRY FUDY COLLECTOR	76,0	7,5*
1.75	NEKONSTRUKČNÍ NOT USED		
1.76	ROZVOJNA NN MV STATION	35,8	3,5
1.77	TRANSFORMANCE T5	35,8	3,5
1.78	TRANSFORMANCE T5 – REZERVA TRANSFORMER ROOM T5 – RESERVE	34,4	3,5
1.79	PŘEČERPAVACÍ STANICE OHLAŠOVACÍ VODY COOL. WATER PUMPING STATION	104,6	3,6*

PRODUCTION HALL - GROUND FLOOR	
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ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.80	PŘEDPŘÍKOVÁ STANICE OPLACH. VOD. PUMPING STATION TO PUMP	48,5	3,6*
1.81	ÚNIKOVÁ CHODBA ESCAPE CORRIDOR	7,8	2,5
1.82	SKLAD NÁHRADNÍCH DÍLŮ SPARE PARTS STORAGE	51,9	3,6*
1.83	ROZVOVNÁ NN LV SUBSTATION	110,9	3,6*
1.84	PRAČOVNĚ FILTRY DUST COLLECTOR	72,9	7,5*
1.85	WC MUŽI TOILET MALE	13,2	2,5
1.86	WC ŽENY TOILET FEMALE	5,0	2,5
1.87	ÚKLIDOVÁ KOMORA CLEANING ROOM	3,6	2,5
1.88	DENNÍ MÍSTNOST DAY ROOM	45,5	3,0
1.89	EXPEDICE FINAL EXPEDITION	721,1	5,3*
1.90	SKLAD ODPOADŮ (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*





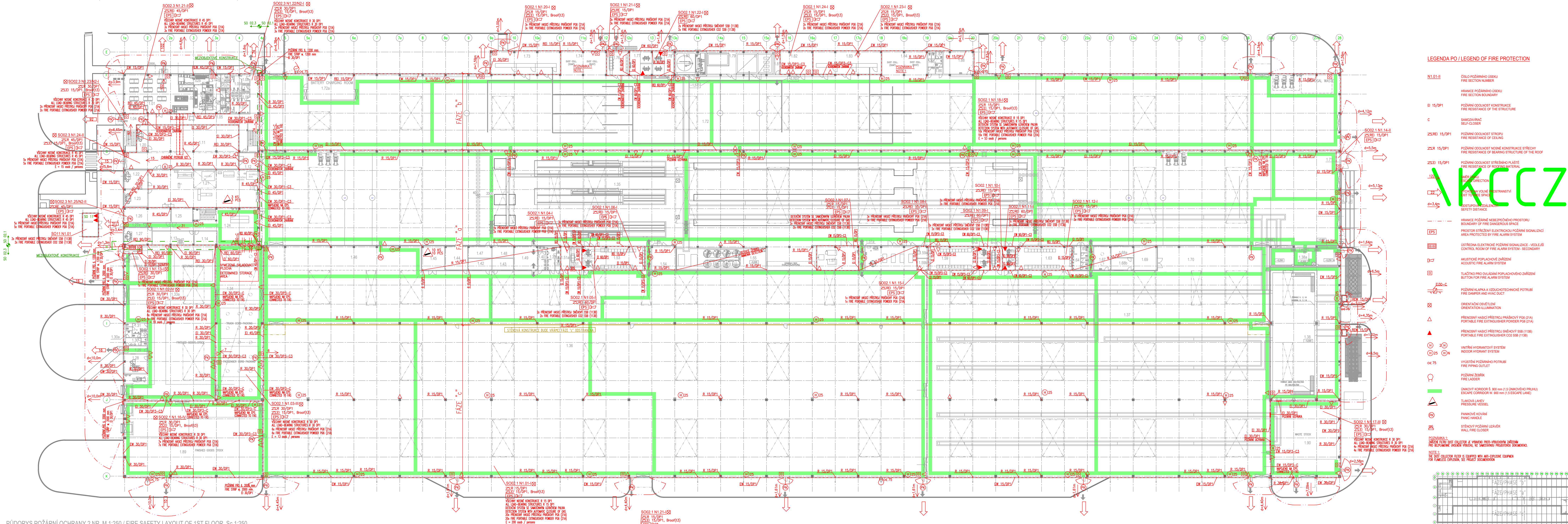
LEGENDA PO / LEGEND OF FIRE PROTECTION

- SMYSL ÚNIKU
ESCAPE DIRECTION
- VÝCHOD NA VOLNÉ PROSTOROVÉ
PARTY TO FREE AREA
- ODSÚPŮVÁ VZDÁLENOST
SAFETY DISTANCE
- HRANICE POŽÁRNĚ NEBEZPEČNÉHO PROSTORU
BOUNDARY OF FIRE DANGEROUS SPACE
- NADZEMNÍ POŽÁRNÍ HYDRANT - VODNÍ
ABOVE-GROUND FIRE HYDRANT
- PODZEMNÍ POŽÁRNÍ HYDRANT - VODNÍ
UNDERGROUND FIRE HYDRANT
- PROSTOR STŘEŽENÝ ELEKTRIKOU POŽÁRNÍ SIGNALIZACE
AREA PROTECTED BY FIRE ALARM SYSTEM
- ÚSTŘEDNA ELEKTRIKY POŽÁRNÍ SIGNALIZACE - VEDLEJŠÍ
CONTROL ROOM OF FIRE ALARM SYSTEM - SECONDARY
- STÁVAJÍCÍ ŘEŠENÍ POŽÁRNÍ BEZPEČNOSTI

STAVEBNÍ OBJEKTY / BUILDING OBJECTS

- SO 01 HALA BW / BEAD WIRE
- SO 02 HALA SC / STEEL CORD
- SO 02.1A HALA SC I. ETAPA - 1. FÁZE / SC PHASE I - PART 1
- SO 02.1B HALA SC I. ETAPA - 2. FÁZE / SC PHASE I - PART 2
- SO 02.1C HALA SC I. ETAPA - 3. FÁZE / SC PHASE I - PART 3
- SO 02.3 HALA SC - Central Battery / Central Isomers
- SO 03 ADMINISTRATIVNÍ BUDOVA / OFFICE BUILDING
- SO 04 VRÁTNICE / GUARDHOUSE
- SO 11 SKLAD LAHVI / GAS STORAGE

PŮDORYS POŽÁRNÍ OCHRANY 1.NP, M 1:250 / FIRE SAFETY LAYOUT OF GROUND FLOOR, Sc:1:250



PŮDORYS POŽÁRNÍ OCHRANY 2.NP, M 1:250 / FIRE SAFETY LAYOUT OF 1ST FLOOR, Sc.1:250

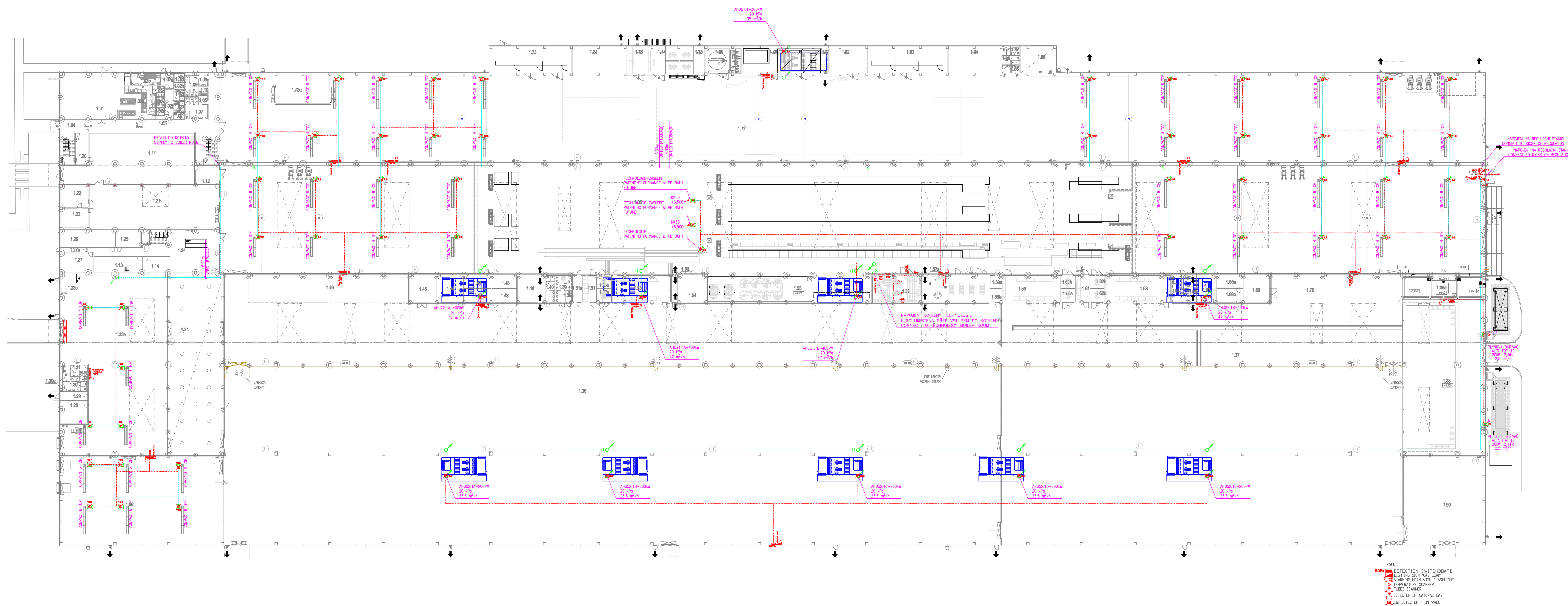
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.01	JEWELRY CANTERS	127.9	3.0
1.02a	YOGESNA - IDEAL FLOOR	75.4	3.0
1.03	UNIFORMS STORAGE AND DRESSING ROOMS	17.1	3.0
1.04	UNIFORMS TEMPORARY AND DRESSING ROOMS + THEATROPHONES	47.3	3.0
1.05a	CHALKBOARD BOX COOLED BOX	47.3	3.0
1.06	STOCK	2.7	3.0
1.07	STOCK	14.1	3.0
1.08a	ENTRANCE/STORAGE DACTYL ENTRANCE/STOCK SUPPLY	8.9	3.0
1.09	WASHROOMS NO. OPERARY OFFICE	3.0	3.0
1.10	ADMINISTRATIVE HOURS OFFICE	4.8	3.0
1.11	SANITARY SINKS, ZENY LOCKERS FOR MEN	6.0	3.0
1.12	SANITARY SINKS, ZENY LOCKERS FOR WOMEN	6.1	3.0
1.13	WC. ZEMPHONES, TRUST EMPLOYEES	3.5	3.0
1.14	NEEDS/NOT USED	-	-
1.15	CHALKBOARD	34.3	3.0
1.16	CHALKBOARD	153.0	3.0
1.17	PROUSE MC. WOOD TOLLET MATE - HALL	5.0	2.5
1.18	MC. WOOD TOLLET MATE - HALL	20.4	2.5
1.19	PROUSE MC. WOOD TOLLET MATE - HALL	5.4	2.5

PRODUCTION MILL - GROUND FLOOR				
ITEM	USE OF ROOM	AREA	CEILING HEIGHT	
1.00	PROSESS MC ZINCY	5.4	2.5	
1.01	TOILET PAPER - HALL			
1.02	MC ZINCY	13.7	2.5	
1.03	TOILET			
1.04	DISPOSING WASTEGOT	2.7	2.5	
1.05	CLEANING ROOM			
1.11	MANAGING ZINCY	290.3	3.7/7.8*	
1.12	SPARE PARTS			
1.13	CHICKEN	22.1	3.7	
1.14	CORRIDOR			
1.15	DRUG CHEMICALS	30.8	3.8	
1.16	CHEMICAL STORAGE			
1.17	DRUG CHEMICALS	20.9	3.8	
1.18	CHEMICAL STORAGE			
1.19-1.20	RECYCLING NOT USED	-	-	
1.21	CHICKEN	19.8	3.0	
1.22	CORRIDOR			
1.23	LODGING	28.5	7.8*	
1.24	MECHANISM			
1.25	HANDLING ELECTRIC DORSEY	2.6	3.0	
1.26	ELECTRO			
1.27	CORRIDOR	28.0	3.0	
1.28	LABORATORY			
1.29	LABORATORY	160.5	3.0	
1.30	FREEZER			
1.31	CHICKEN	21.3	3.5	
1.32	CORRIDOR			
1.33	TECHNICAL MONTGOMERY	46.9	3.5	
1.34	EQUIPMENT ROOM No.1			
1.35	TECHNICAL MONTGOMERY	55.4	3.0	
1.36	QUALITY CONTROL			
1.37	CHICKEN	5.9	3.0	
1.38	CORRIDOR			
1.39	HANDLING PRISING	30.0	3.0	
1.40	RECOVERY OFFICE			
1.41	CHICKEN	12.3	3.0	
1.42	CORRIDOR			

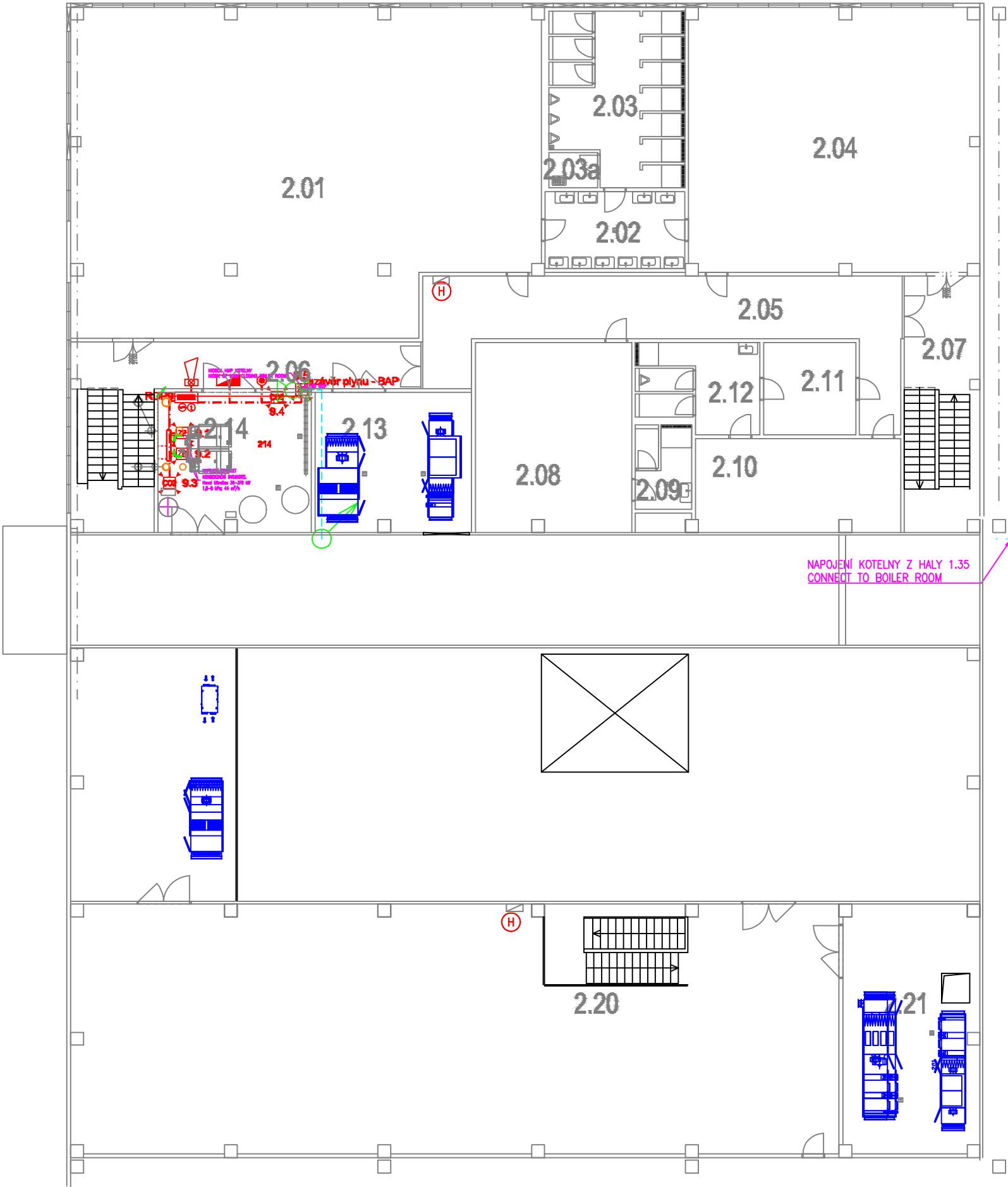
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.30	HC FLOOR	10.7	2.5
1.31	TOILET DRESS	1.0	2.5
1.32	DISCUSSION METROST CLEANING ROOM	11.8	2.5
1.33	HC MULTI TOILET MALE	2.3	2.5
1.34	HC MULTI TOILET FEMALE	4.9	2.5
1.35	OFFICE	870.4	6.5*
1.36	FLAT EXPEDITION	9.0	3.0
1.37	BOUNDS & 400 FIRE SMOOTHER	9.0	3.0
1.38	BOUNDS & 400 CLOAKING ROOM	508.2	4.0
1.39	PODOLAN PLANT	7031.5	6.7*
1.40	SILKENT & ANGLE INTERIOR	9415.1	5.1*
1.41	FINISH FINISH FINISH	4870.4	5.1*
1.42	LIBRARY	645.5	5.1*
1.43	LIBRARY SILKENT & ANGLE	645.5	5.1*
1.44	SILKENT & ANGLE SILKENT & ANGLE	86.1	5.1*
1.45	HC MULTI TOILET MALE	16.9	2.5
1.46	DISCUSSION METROST CLEANING ROOM	3.6	2.5
1.47	HC MULTI TOILET FEMALE	12.0	2.5
1.48	TOILET NOT USED	---	---
1.49	MANAGER CONTROL OR SUPERVISOR	18.0	3.0
1.50	KANELLER VOODOO CONTROL OR LEADER OFFICE	18.0	3.0
1.51	KANELLER DISCUSSION HALL	36.7	3.0
1.52	KANELLER DISCUSSION HALL	36.7	3.0

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
145	SKUPŠTINA MEDICINSKI SKLADIŠTE	37,9	3,0
146	PROJEKCIJA I PRAZNOJE OPCIJE KAMAR ZA KONTROLU I POSREDOVANJE	123,5	5,1*
147	PLATING SUPERVISOR'S OFFICE	16,7	3,0
148	KAMAR ZA KONTROLU I POSREDOVANJE PLATING SUPERVISOR OFFICE	16,7	3,0
149	KAMAR ZA OPCIJE	37,7	3,0
150	OSNOVNA DOKOLICA CISCAR CORRIDOR	8,7	2,5
151	ROZVOJNA NN U SVETLOSTENI	18,0	3,5
151a	ROZVOJNA NN U SVETLOSTENI	13,0	3,5
152	TRANSFORMATOR TRANSFORMER ROOM	9,7	3,5
152a	TRANSFORMATOR TRANSFORMER ROOM	8,5	3,5
153	ROZVOJNA NN U SVETLOSTENI	77,2	3,5
154	SKUPŠTINA CISCAR DOKOLICA	38,3	5,1*
155	PERMANENTNA I NEKEMIJSKA CHEMICAL PREPARATION AND STORAGE	237,9	5,1
156	OTVORNO BOLTER	0,0	---
157	OTVORNO BOLTER	0,0	---
157a	CISCAR CORRIDOR	9,2	2,5
158	KOMPRESORNA COMPRESSOR ROOM	84,8	5,1
159	ROZVOJNA NN U SVETLOSTENI	76,2	3,5
159a	ROZVOJNA ODRZAVANJE OPEVATINE U SVETLOSTENI	8,0	3,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	CEILING HEIGHT
1.59	ROZVOJNA	7.9	3.5
1.60	ROZVOJNA	7.9	3.5
1.60	TRANSFORMER ROOM T1	7.9	3.5
1.60	TRANSFORMER ROOM T2	6.3	3.5
1.61	ROZVOJNA	18.0	3.5
1.62	TRANSFORMER (KOTLOVNA)	7.9	3.5
1.62	TRANSFORMER ROOM T4 (SHR)	7.9	3.5
1.62	TRANSFORMER ROOM T3	6.3	3.5
1.63	ROZVOJNA	8.7	3.5
1.64	ROZVOJNA	11.4	2.5
1.65	TOILET MALE	1.8	2.5
1.66	KC ZENY	5.2	2.5
1.67	TOILET FEMALE	1.8	2.5
1.68	KUCHA	6.3	2.0
1.68	CORRIDOR	6.3	2.0
1.67	KANCELAR	26.8	3.0
1.68	KANCELAR PRÁVNÍHO PROTŘEVENÍ FINAN. GRANTING OFFICE	16.9	3.0
1.68	KANCELAR PRÁVNÍHO PROTŘEVENÍ FINAN. GRANTING OFFICE	16.9	3.0
1.69	SKLAD PRÁVNÍHO PROTŘEVENÍ DEP. FINAN.	28.1	3.0
1.70	SKLAD PRÁVNÍHO PROTŘEVENÍ DEP. FINAN.	15.0	5.1*
1.71	REGULAČNÍ STANICE PLUVNI MAIN ELEVATOR OF PLUVNI	4.5	3.2
1.72	PRACOVNÍ PLOŠA WORK FLOOR	76.0	7.5
1.75	NEBOŽIVNÁ NO USE		
1.76	ROZVOJNA	35.8	3.5

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GAS DETECTION FIRST FLOOR 1:50

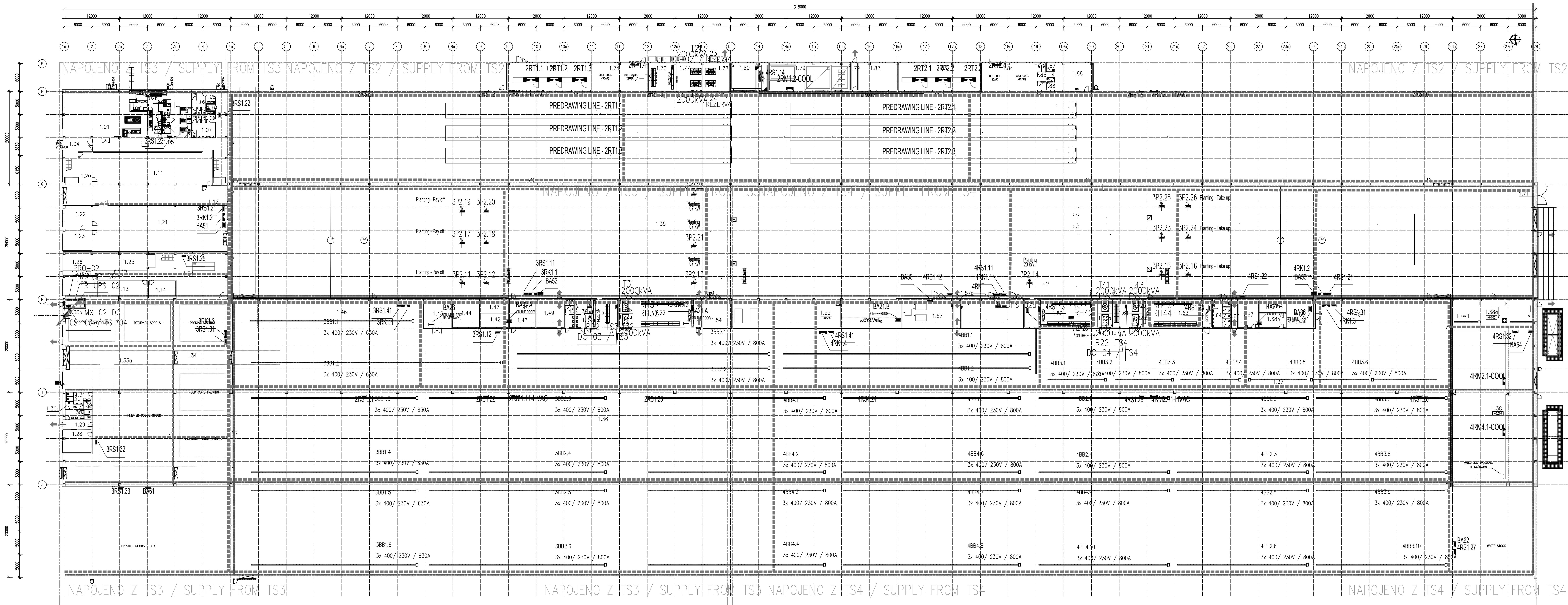


VÝROBNÍ HALA - 2NP PRODUCTION HALL - FIRST FLOOR		S0 02	
OZN. ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	SVĚTLÁ VÝŠKA CEILING HEIGHT [m]
2.01	ŠATNY MUŽI LOCKERS MEN	223,7	3,0
2.02	UMÝVADLOVÁ PŘEDÍŇ MEN – SINK ANTE–ROOM	16,4	3,0
2.03	SPRCHY + WC SHOWERS + TOILETS MEN	33,6	2,5
2.03a	ÚKLIDOVÁ MÍSTNOST CLEANING ROOM	2,6	2,5
2.04	ŠATNY MUŽI LOCKERS MEN	116,6	3,0
2.05	CHODBA CORRIDOR	55,5	3,0
2.06	CHODBA CORRIDOR	42,6	3,0
2.07	CHODBA CORRIDOR	29,1	3,0
2.08	ŠATNY ŽENY LOCKERS WOMEN	44,3	3,0
2.09	SPRCHY + WC ŽENY SHOWERS + TOILETS WOMEN	7,3	3,0
2.10	HYGIENICKÁ ŠATNA MUŽI HYGIENIC LOCKERS MEN	28,0	3,0
2.11	ČISTÁ ŠATNA MUŽI HYGIENIC LOCKERS MEN	13,0	3,0
2.12	SPRCHY + WC SHOWERS + TOILETS MEN	15,1	2,5
2.13	STROJOVNA VZT HVAC TECHNICAL AREA	32,2	3,3*
2.14	KOTELNA BOILER ROOM	31,7	3,3*
2.15	ROZVODNA NN LV SUBSTATION	111,4	3,5*

2.20	SKLAD PRO LABORATOŘ STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

- LEGEND:
- RDPx DETECTION SWITCHBOARD
 - LIGHTING SIGN "GAS LEAK"
 - ☠ ALARMING HORN WITH FLASHLIGHT
 - ⊕ TEMPERATURE SCANNER
 - ⊖ FLOOD SCANNER
 - ▭ DETECTOR OF NATURAL GAS
 - ▭ CO2 DETECTOR - ON WALL

ELECTRICAL INTERIOR, GROUND FLOOR 1:250



PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling height
1.01	JÍDELNA CANTEN	127,9	3,0
1.02a	VÝROBNÁ JÍDEL FOOD OUTPUT	73,4	3,0
1.02b	UMÝVÁRNA STOLNÍHO NÁDOBÍ WASHROOM DISHES	17,1	3,0
1.02c	UMÝVÁRNA TERMOPORTÚ A NÁDOBÍ WASHROOM DISHES + THERMOPORTS	5,5	3,0
1.02d	CHLAZENÝ BOX COOLED BOX	4,7	3,0
1.02e	SKLAD STOCK	2,7	3,0
1.02f	CHOBOA CORRIDOR	14,1	3,0
1.02g	VSTUP/ZASOBOVÁNÍ GASTRA ENTRANCE/FOOD SUPPLY	8,9	3,0
1.02h	MÍSTNOST NA ODPAZÝ WASTE	3,0	3,0
1.02i	ADMINISTRATIVNÍ KOUTÍ OFFICE	4,8	3,0
1.02j	SATNA+SPRCHA MUŽI LOCKERS+SHOWER MEN	6,0	3,0
1.02k	SATNA+SPRCHA ŽENY LOCKERS+SHOWER WOMEN	6,1	3,0
1.02l	WC ZAMĚSTNANCŮ TOILET EMPLOYEES	3,5	3,0
1.03	NEOBSAŽENO NOT USED	---	---
1.04	CHOBOA CORRIDOR	34,3	3,0
1.05	CHOBOA CORRIDOR	133,0	3,0
1.06	PŘÍSLUŠNÁ WC MUŽI TOILET MALE - HALL	5,0	2,5
1.07	WC MUŽI TOILET MALE	20,4	2,5
1.08	PŘÍSLUŠNÁ WC ŽENY TOILET FEMALE - HALL	5,4	2,5
1.09	WC ŽENY TOILET FEMALE	13,7	2,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling height
1.10	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,7	2,5
1.11	NAHRAZENÍ DÍLY SPARE PARTS	295,2	3,7/7,6*
1.12	CHOBOA CORRIDOR	22,1	3,7
1.13	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	38,8	3,8
1.14	SKLAD CHEMIKÁLÍ CHEMICAL STORAGE	20,9	3,8
1.15-1.17	NEOBSAŽENO NOT USED	---	---
1.20	KANCELÁŘ OFFICE	19,8	3,0
1.21	OKLADOVÁ MÍSTNOST CLEANING ROOM	285,4	7,6*
1.22	KANCELÁŘ ELEKTRO ODPADY OFFICE ELECTRIC	29,6	3,0
1.23	KANCELÁŘ OFFICE	28,0	3,0
1.24	LABORATOR	160,5	3,0
1.25	TVRZENÍ EQUIPMENT ROOM No.1	21,2	3,5
1.26	TECHNICKÁ MÍSTNOST EQUIPMENT ROOM No.2	46,9	3,5
1.27	KANCELÁŘ KVALITY QUALITY CONTROL	33,4	3,0
1.27a	CHOBOA CORRIDOR	5,9	3,0
1.28	KANCELÁŘ PRŮMYSLU DELIVERY OFFICE	30,0	3,0
1.29	CHOBOA CORRIDOR	12,3	3,0
1.30	WC ŘÍDÍČI TOILET DRIVERS	10,7	2,5
1.30a	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,8	2,5
1.31	WC MUŽI TOILET MALE	11,3	2,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling height
1.32	WC ŽENY TOILET FEMALE	4,9	2,5
1.33a	EXPEDICE FINAL EXPEDITION	870,4	5,3*
1.33b	ROZVADEČ RPO A EPS FIRE SWITCHROOM	9,0	3,0
1.34	KONTROLA BALENÍ CONTROL PACKING ROOM	508,2	4,0
1.35	POKROVŮVNÍ PLÁSTIK	7031,5	6,7*
1.36	SPLÉTÁNÍ A NAVAZENÍ TWISTING AND CABLEING	8413,1	5,1*
1.37	FINÁLNÍ PROTAHOVÁNÍ FINAL DRAWING	4870,4	5,1*
1.38	SKLAD KONTROLNÍ DÍLŮ CULZIN STORAGE	645,5	5,1*
1.38a	SKLAD KYSELIN - TANKY ACID STORAGE - TANKS	96,1	5,1*
1.39	WC MUŽI TOILET MALE	16,9	2,5
1.39a	OKLADOVÁ MÍSTNOST CLEANING ROOM	3,6	2,5
1.40	WC ŽENY TOILET FEMALE	12,0	2,5
1.41	NOT USED	---	---
1.42	KANCELÁŘ KONTROLY CB SUPERVISOR OFFICE	18,0	3,0
1.43	KANCELÁŘ VEDOUČHO KONTROLY CB LEADER MAN OFFICE	16,2	3,0
1.44	KANCELÁŘ KONTROLY ROZVOJE CB DEVELOPMENT TEAM	35,7	3,0
1.45	SKLAD SVÁŘECÍ WELDERS TOOLS STORAGE	37,9	3,0
1.46	PŘÍSLUŠNÁ / PRAKTIČNÍ ČINNOST CB REWINDER / EMPTY SPOOLS STOCK	232,5	5,1*
1.47	KANCELÁŘ KONTROLY POKROVNÍ PLATING SUPERVISOR OFFICE	18,3	3,0
1.48	KANCELÁŘ KONTROLY POKROVNÍ PLATING SUPERVISOR OFFICE	16,7	3,0

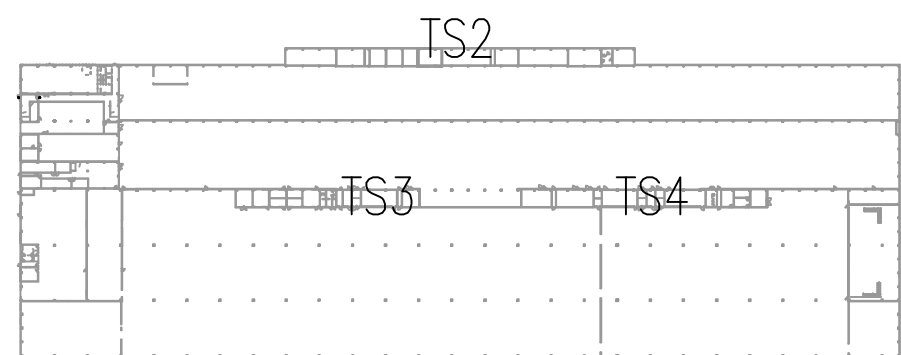
PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling height
1.49	KANCELÁŘ OFFICE	37,7	3,0
1.50	OKNOVÁ CHOBOA ESCAPE CORRIDOR	8,7	2,5
1.51	ROZVODNA VN LV SUBSTATION	18,0	3,5
1.51a	CHOBOA CORRIDOR	13,0	3,5
1.52a	TRAFOSTANICE TRANSFORMER ROOM	9,7	3,5
1.52b	TRAFOSTANICE TRANSFORMER ROOM	9,5	3,5
1.53	FINÁLNÍ PROTAHOVÁNÍ FINAL DRAWING OFFICE	77,2	3,5
1.54	SKLAD PROTAHOVACÍCH OČEK ICE SHOP	39,3	5,1*
1.55	PŘÍPRAVA A SKLAD CHEMIKÁLÍ CHEMICAL PREPARATION AND STOREY	231,9	5,1*
1.56	NEOBSAŽENO NOT USED	---	---
1.57	KOTELNA HEATER ROOM	68,5	5,1*
1.57a	CHOBOA CORRIDOR	9,2	2,5
1.58	KOMPRESOROVNA COMPRESSOR ROOM	84,9	5,1*
1.59	ROZVODNA VN LV SUBSTATION	76,2	3,5
1.59a	ROZVODNA ORIENTAČNÍ OSVĚTLENÍ ORIENTATION LIGHTING SUBSTATION	8,0	3,5
1.59b	KANCELÁŘ KONTROLY CB SUPERVISOR OFFICE	7,9	3,5
1.60a	TRAFOSTANICE T1 TRANSFORMER ROOM T1	9,7	3,5
1.60b	TRAFOSTANICE T2 TRANSFORMER ROOM T2	9,3	3,5
1.61	ROZVODNA VN LV SUBSTATION	18,0	3,5
1.62a	TRAFOSTANICE T3 TRANSFORMER ROOM T3	9,7	3,5
1.62b	TRAFOSTANICE T4 TRANSFORMER ROOM T4	9,3	3,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling height
1.63	ROZVODNA VN LV SUBSTATION	87,3	3,5
1.64	WC MUŽI TOILET MALE	18,1	2,5
1.65	WC ŽENY TOILET FEMALE	5,2	2,5
1.66	CHOBOA CORRIDOR	8,3	2,5
1.67	KANCELÁŘ OFFICE	26,8	3,0
1.68a	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	16,9	3,0
1.68b	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	18,0	3,0
1.69	SKLAD PROTAHOVACÍCH OČEK ICE SHOP	38,1	3,0
1.70	OPADY FINÁLNÍHO PREVENÍ FID SHOP	155,0	5,1*
1.71	REGULAČNÍ STANICE PLYNU MAIN CLOSER OF NG	4,5	3,2
1.72	MOŘENÍ PRE-DRAWING	5478,2	6,7*
1.72a	NABÍJEČ STANICE BATTERY CHARGING ROOM	80,5	6,7*
1.73	ROZVODNA VN LV SUBSTATION	108,6	3,6*
1.74	PRAKTIČNÍ FILTRY DUST COLLECTOR	76,0	7,5*
1.75	NEOBSAŽENO NOT USED	---	---
1.76	ROZVODNA VN LV SUBSTATION	35,8	3,5
1.77	TRAFOSTANICE T5 TRANSFORMER ROOM T5	35,8	3,5
1.78	TRAFOSTANICE T6 - REZERVA TRANSFORMER ROOM T6 - RESERVE	34,4	3,5
1.79	PŘEDČERPÁVACÍ STANICE CHLAZENÍ VODY COOLING WATER PUMPING STATION	104,6	3,6*
1.80	PŘEDČERPÁVACÍ STANICE OPLACH. VOD PUMPING STATION TO PWIP	48,5	3,6*
1.81	OKNOVÁ CHOBOA ESCAPE CORRIDOR	7,8	2,5

PRODUCTION HALL - GROUND FLOOR			
ITEM	USE OF ROOM	AREA	Ceiling height
1.82	SKLAD NÁHRADNÍCH DÍLŮ SPARE PARTS STORAGE	51,9	3,6*
1.83	ROZVODNA VN LV SUBSTATION	110,9	3,6*
1.84	PRAKTIČNÍ FILTRY DUST COLLECTOR	72,9	7,5*
1.85	WC MUŽI TOILET MALE	13,2	2,5
1.86	WC ŽENY TOILET FEMALE	5,0	2,5
1.87	OKLADOVÁ KOMORA CLEANING ROOM	3,6	2,5
1.88	DENNÍ MÍSTNOST DAY ROOM	45,5	3,0
1.89	EXPEDICE FINAL EXPEDITION	721,1	5,3*
1.90	SKLAD ODPAZD (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*

LEGENDA / LEGEND

- KABELOVÉ LÁVKY, ŽILY - PROVOZNÍ NÁPAJENÍ CABLE TRAYS, THROUGHS - OPERATION SUPPLY
- KABELOVÉ LÁVKY, ŽILY S FUNKCÍ PŘI POŽÁRU CABLE TRAYS, THROUGHS WITH FUNCTION IN FIRE
- PŘÍPOJNICOVÝ NÁPAJECÍ SYSTÉM 3x400V / 630-800A BUSBARS SUPPLY SYSTEM 3x400V / 630-800A
- HRANICE NÁPAJENÍ SWITCHBOARDS LIMIT
- KABELOVÁ STOUPAČKA CABLE RISER
- 3F VÝVOD 3 PHASE OUTLET
- RHx - HLAVNÍ ROZVADEČ RHx - MAIN SWITCHBOARD
- RPO - POŽÁRNÍ ROZVADEČ RPO - SWITCHBOARD OF FIRE SAFETY
- RK-x - KABELOVÝ ROZVADEČ RK-x - CABLE SWITCHBOARD
- RS-x - SVĚTLÝNÝ ROZVADEČ RS-x - LIGHTING PANEL
- R-UPSx - ROZVADEČ NOUZOVÉHO OSVĚTLENÍ R-UPSx - EMERGENCY LIGHTING SWITCHBOARD
- RKT - ROZVADEČ KOMPRESORU RKT - SWITCHBOARD OF COMPRESSOR
- Bax - ROZVADEČ MĚŘENÍ A REGULACE, DODÁVKA MĚŘ. Bax - SWITCHBOARD INSTRUMENTATION AND CONTROL, DELIVERY OF I&C



2.20	SKLAD PRO LABORATOR STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

The diagram illustrates a cable tray system layout. At the top, a horizontal cable tray is shown with a dashed line indicating a cable path. Below this, a vertical cable riser is depicted. To the left of the riser, a cable tray is labeled 'Z TS2 / FROM T'. An arrow points from this tray to a '3P...' label. To the right of the riser, a '3F VÝVOD' (3 Phase Outlet) is shown. Below the riser, a 'RHX - HLAVNÍ ROZVADOČ' (Main Switchboard) is indicated. Further down, a 'RPO - POŽÁRNÍ ROZVADOČ' (Fire Safety Switchboard) is shown. Below that, a 'RK-x KABELOVÝ ROZVADOČ' (Cable Switchboard) is depicted. Further down, a 'RS-x - SVĚTLNÝ ROZVADOČ' (Lighting Panel) is shown. Below that, a 'R-UPSx - ROZVADOČ NOUZOVÉHO OSVĚTLENÍ' (Emergency Lighting Switchboard) is indicated. Further down, a 'RKT - ROZVADOČ KOMPRESORU' (Compressor Switchboard) is shown. Below that, a 'Bax - ROZVADOČ MĚŘENÍ A REGULACE, DOĐÁVKA MoR' (Measurement and Regulation Switchboard, MoR Supply) is indicated. Finally, at the bottom, a 'Bax - SWITCHBOARD INSTRUMENTATION AND CONTROL, DELIVERY OF I&C' is shown. The diagram also includes a 'PŘÍPOJNICOVÝ NAPÁJECÍ SYSTÉM 3x400V / 630-800A' (Connection Supply System 3x400V / 630-800A) and a 'BUSBARS SUPPLY SYSTEM 3x400V / 630-800A'.

KABELOVÉ LÁVKY, ŽLABY – PROVOZNÍ NAPÁJENÍ
CABLE TRAYS, THROUGHS – OPERATION SUPPLY
KABELOVÉ LÁVKY, ŽLABY S FUNKCÍMI PŘI POŽÁRU
CABLE TRAYS, THROUGHS WITH FUNCTION IN FIRE

PŘÍPOJNICOVÝ NAPÁJECÍ SYSTÉM 3x400V / 630-800A
BUSBARS SUPPLY SYSTEM 3x400V / 630-800A

Ž TS2 / FROM T

3P...

3F VÝVOD
3 PHASE OUTLET

RHX – HLAVNÍ ROZVADOČ
RHX – MAIN SWITCHBOARD

RPO – POŽÁRNÍ ROZVADOČ
RK – SWITCHBOARD OF FIRE SAFETY

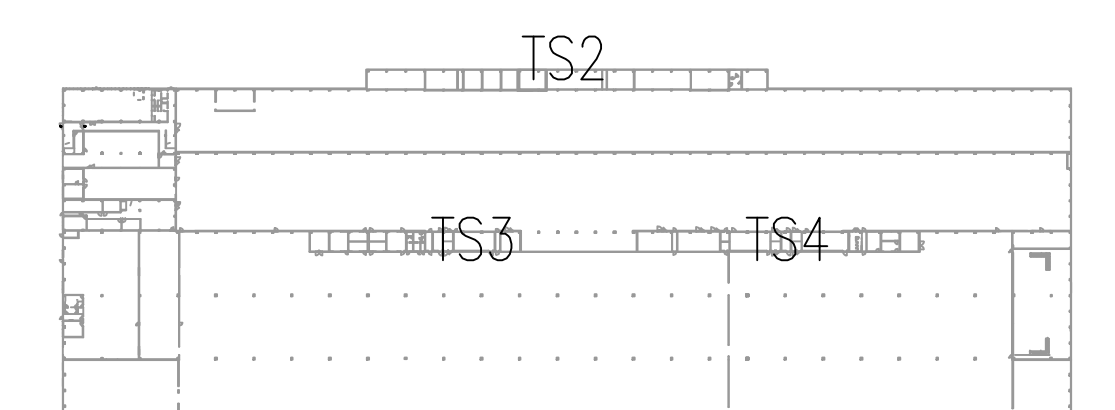
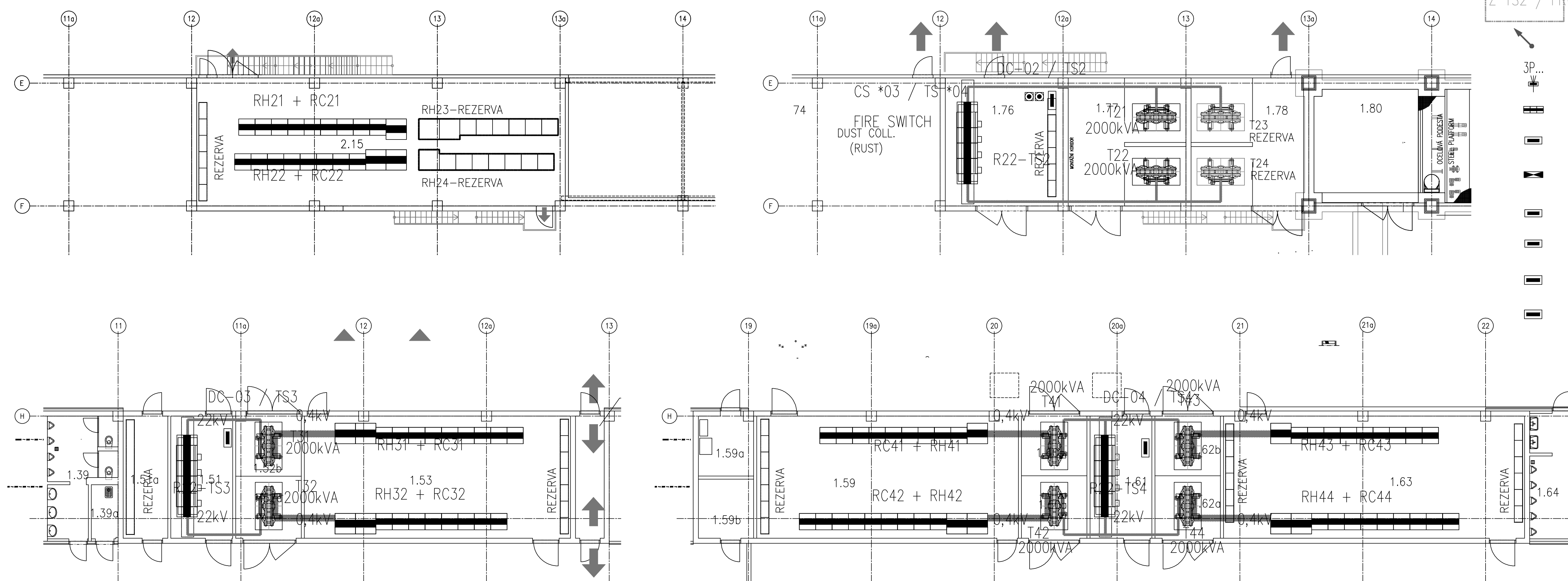
RK-x KABELOVÝ ROZVADOČ
RK-x CABLE SWITCHBOARD

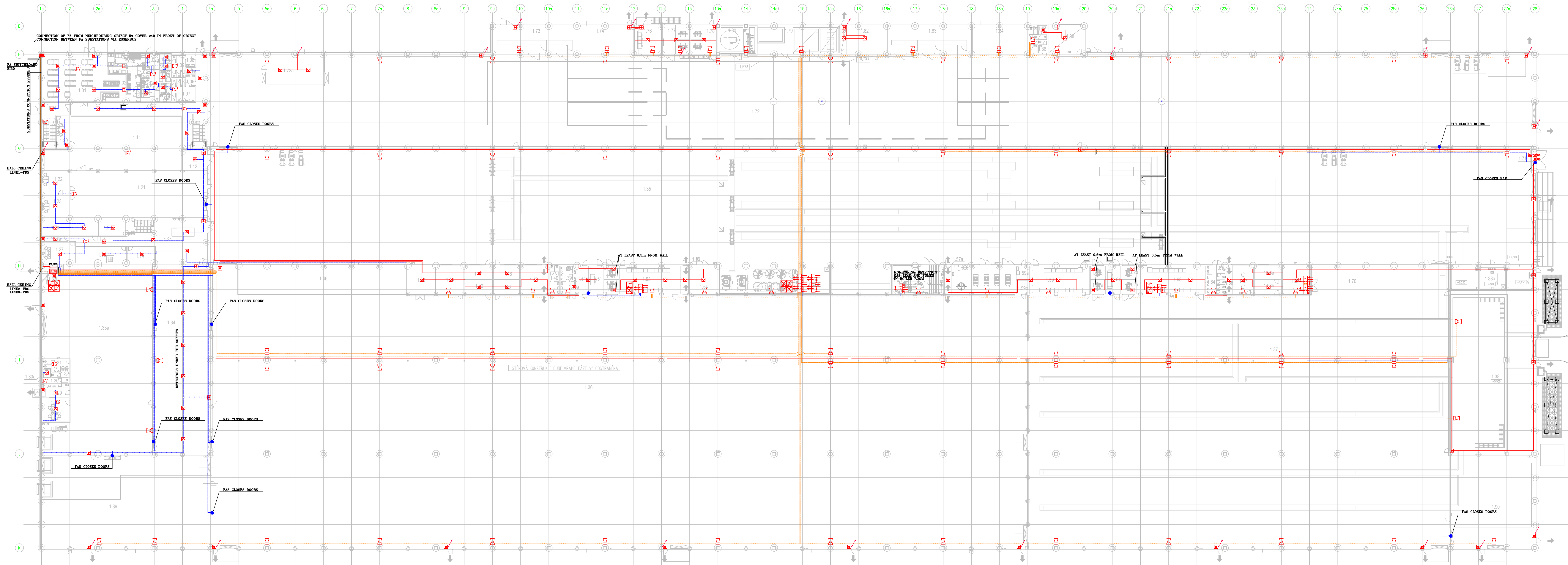
RS-x – SVĚTLNÝ ROZVADOČ
RS-x – LIGHTING PANEL

R-UPSx – ROZVADOČ NOUZOVÉHO OSVĚTLENÍ
R-UPSx – EMERGENCY LIGHTING SWITCHBOARD

RKT – ROZVADOČ KOMPRESORU
RKT – SWITCHBOARD OF COMPRESSOR

Bax – ROZVADOČ MĚŘENÍ A REGULACE, DOĐÁVKA MoR
Bax – SWITCHBOARD INSTRUMENTATION AND CONTROL,
DELIVERY OF I&C





VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR				SO 02
ČKČL ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	ŠÍŘKA VÝŠKA CEILING HEIGHT [m]	
1.01	JÍDELNA CANTEEN	127,8	3,0	
1.02a	VÝDEJNA JÍDEL FOOD OUTLET	73,4	3,0	
1.02b	UMÝVÁRNA STOLNÍHO NÁDOBÍ WASHROOM DISHES	17,1	3,0	
1.02c	UMÝVÁRNA TERMOPORTO A NÁDOBÍ WASHROOM DISHES + THERMOPORTS	5,5	3,0	
1.02d	CHLAZENÍ BOX COOLED BOX	4,7	3,0	
1.02e	SKLAD STOCK	2,7	3,0	
1.02f	CHODBA CORRIDOR	14,1	3,0	
1.02g	VSTUP/ZASOBOVÁNÍ GASTRA ENTRANCE/FOOD SUPPLY	8,9	3,0	
1.02h	MÍSTNOST NA ODPADY WASTE	3,0	3,0	
1.02i	ADMINISTRATIVNÍ KOUT PETS	4,8	3,0	
1.02j	SÁTKA+SPRCHA MUŽI LOCKERS+SHOWER MEN	6,0	3,0	
1.02k	SÁTKA+SPRCHA ŽENY LOCKERS+SHOWER WOMEN	6,1	3,0	
1.02l	WC ZAMĚSTNANCŮ TOILET EMPLOYEES	3,5	3,0	
1.03	NEOBSAŽENO NOT USED	-	-	
1.04	CHODBA CORRIDOR	34,3	3,0	
1.05	CHODBA CORRIDOR	133,0	3,0	
1.06	PŘEDSÍŇ WC MUŽI TOILET MALE - HALL	5,0	2,5	
1.07	WC MUŽI TOILET MALE	20,4	2,5	
1.08	PŘEDSÍŇ WC ŽENY TOILET FEMALE - HALL	5,4	2,5	
1.09	WC ŽENY TOILET FEMALE	13,7	2,5	
1.10	OKLADOVÁ MÍSTNOST CLEANING ROOM	2,7	2,5	
1.11	NÁHRADNÍ DÍLY SPARE PARTS	295,2	3,7/7,6*	
1.12	CHODBA CORRIDOR	22,1	3,7	

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR				SO 02
ČKČL ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	ŠÍŘKA VÝŠKA CEILING HEIGHT [m]	
1.13	SKLAD CHEMIKÁLIÍ CHEMICAL STORAGE	36,8	3,8	
1.14	SKLAD CHEMIKÁLIÍ CHEMICAL STORAGE	20,9	3,8	
1.15-1.19	NEOBSAŽENO NOT USED	-	-	
1.20	KANCELÁŘ OFFICE	19,8	3,0	
1.21	OKRŽBA MAINTENANCE	285,4	7,6*	
1.22	KANCELÁŘ ELEKTRO OKRŽBY OFFICE ELECTRO	29,6	3,0	
1.23	KANCELÁŘ OFFICE	28,0	3,0	
1.24	LABORATOR LABORATORY	160,5	3,0	
1.25	TVRZENÍ CURING	21,2	3,5	
1.26	TECHNICKÁ MÍSTNOST EQUIPMENT ROOM No.1	46,9	3,5	
1.27	KANCELÁŘ KVALITY QUALITY CONTROL	33,4	3,0	
1.27a	CHODBA CORRIDOR	5,9	3,0	
1.27b	KANCELÁŘ PRÁKMU DELIVERY OFFICE	30,0	3,0	
1.29	CHODBA CORRIDOR	12,3	3,0	
1.30	WC ŘIDIČŮ TOILET DRIVERS	10,7	2,5	
1.30a	SKLADOVÁ MÍSTNOST CLEANING ROOM	2,8	2,5	
1.31	WC MUŽI TOILET MALE	11,3	2,5	
1.32	WC ŽENY TOILET FEMALE	4,9	2,5	
1.33a	EXPEDICE FINAL EXPEDITION	870,4	5,3*	
1.33b	ROZVÁDĚČ RPO A EPS FIRE SWITCHROOM	9,0	3,0	
1.34	KONTROLA BALENÍ CONTROL PACKING ROOM	508,2	4,0	
1.35	POKOVOVÁNÍ FLATTING	7031,5	6,7*	
1.36	SPLETÁNÍ A NAVÍJENÍ TWISTING AND CABELING	9413,1	5,1*	

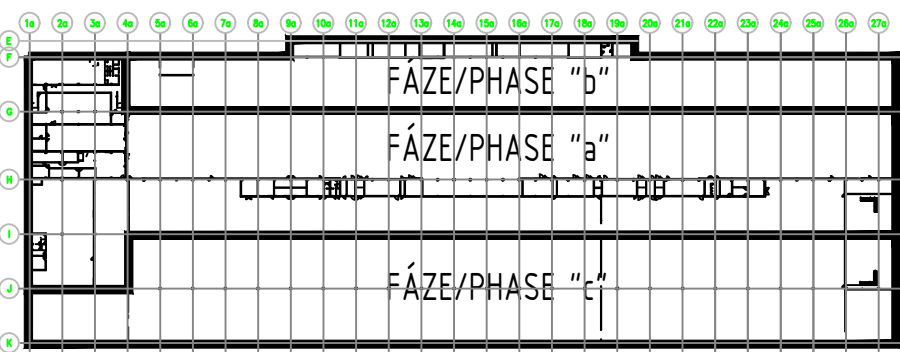
VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR				SO 02
ČKČL ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	ŠÍŘKA VÝŠKA CEILING HEIGHT [m]	
1.37	FINÁLNÍ PROTAHOVÁNÍ FINAL DRAWING	4870,4	5,1*	
1.38	LUBRIKANT LUBRICANT TANKS	645,5	5,1*	
1.38a	SKLAD KYSELIN - TANKY ACID STORAGE - TANKS	96,1	5,1*	
1.39	WC MUŽI TOILET MALE	16,9	2,5	
1.39a	OKLADOVÁ MÍSTNOST CLEANING ROOM	3,6	2,5	
1.40	WC ŽENY TOILET FEMALE	12,0	2,5	
1.41	NOT USED	---	---	
1.42	KANCELÁŘ KONTROLY CB SUPERVISOR OFFICE	18,0	3,0	
1.43	KANCELÁŘ KONTROLY POKOVENÍ CB LEADER MAN OFFICE	16,2	3,0	
1.44	KANCELÁŘ VÝVOJE DEVELOPMENT TEAM	35,7	3,0	
1.45	SKLAD SVÁŘECÍ WELDING TOOLS STORAGE	37,9	3,0	
1.46	PŘEVÍJENÍ / PRAŽDINÉ OKY CB REWINDER / EMPTY SPOOLS STOCK	232,5	5,1*	
1.47	KANCELÁŘ KONTROLY POKOVENÍ PLATING SUPERVISOR OFFICE	16,7	3,0	
1.48	KANCELÁŘ OFFICE	37,7	3,0	
1.49	OKRÁVÁ CHODBA ESCAPE CORRIDOR	8,7	2,5	
1.50	ROZVOJNA VN HV SUBSTATION	18,0	3,5	
1.51a	ROZVOJNA NN LV SUBSTATION	13,0	3,5	
1.52a	KANCELÁŘ OFFICE	9,7	3,5	
1.52b	TRAFOSTANICE TRANSFORMER ROOM	9,5	3,5	
1.53	ROZVOJNA NN LV SUBSTATION	77,2	3,5	
1.54	SKLAD KOVÝCH DÍLŮ CU/ZN STORAGE	39,3	5,1*	
1.55	PŘÍPRAVA A SKLAD CHEMIKÁLIÍ CHEMICAL PREPARATION AND STOREY	231,9	5,1*	

VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR				SO 02
ČKČL ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	ŠÍŘKA VÝŠKA CEILING HEIGHT [m]	
1.56	NEOBSAŽENO NOT USED	---	---	
1.57	KOTELNA BOILER ROOM	68,5	5,1*	
1.57a	CHODBA CORRIDOR	9,2	2,5	
1.58	KOMPRESOROVNA COMPRESSOR ROOM	84,9	5,1*	
1.59	ROZVOJNA NN LV SUBSTATION	76,2	3,5	
1.59a	ROZVOJNA ORIENTAČNÍHO OSVĚTLENÍ ORIENTATION LIGHTING SUBSTATION	8,0	3,5	
1.59b	REZERVA RESERVE	7,9	3,5	
1.60a	TRAFOSTANICE T1 TRANSFORMER ROOM T1	9,7	3,5	
1.60b	TRAFOSTANICE T2 TRANSFORMER ROOM T2	9,3	3,5	
1.61	ROZVOJNA VN HV SUBSTATION	18,0	3,5	
1.62a	TRAFOSTANICE T3 TRANSFORMER ROOM T3	9,7	3,5	
1.62b	TRAFOSTANICE T4(REZERVA) TRANSFORMER ROOM T4 (SPARE)	9,3	3,5	
1.63	ROZVOJNA NN LV SUBSTATION	87,3	3,5	
1.64	WC MUŽI TOILET MALE	18,1	2,5	
1.65	WC ŽENY TOILET FEMALE	5,2	2,5	
1.67	CHODBA CORRIDOR	8,3	2,5	
1.67	KANCELÁŘ OFFICE	26,8	3,0	
1.68a	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	16,9	3,0	
1.68b	KANCELÁŘ FINÁLNÍHO PROTAHOVÁNÍ FINAL DRAWING OFFICE	18,0	3,0	
1.69	SKLAD PROTAHOVACÍCH OŠEK DE SHIP	38,1	3,0	
1.70	ODPADY FINÁLNÍHO PŘEVÍJENÍ FINAL EXPEDITION	155,0	5,1*	
1.71	REGULAČNÍ STANICE PLYNU MAIN CLOSER OF NG	4,5	3,2	
1.72	MOKRA WET-DRAWING	5478,2	6,7*	

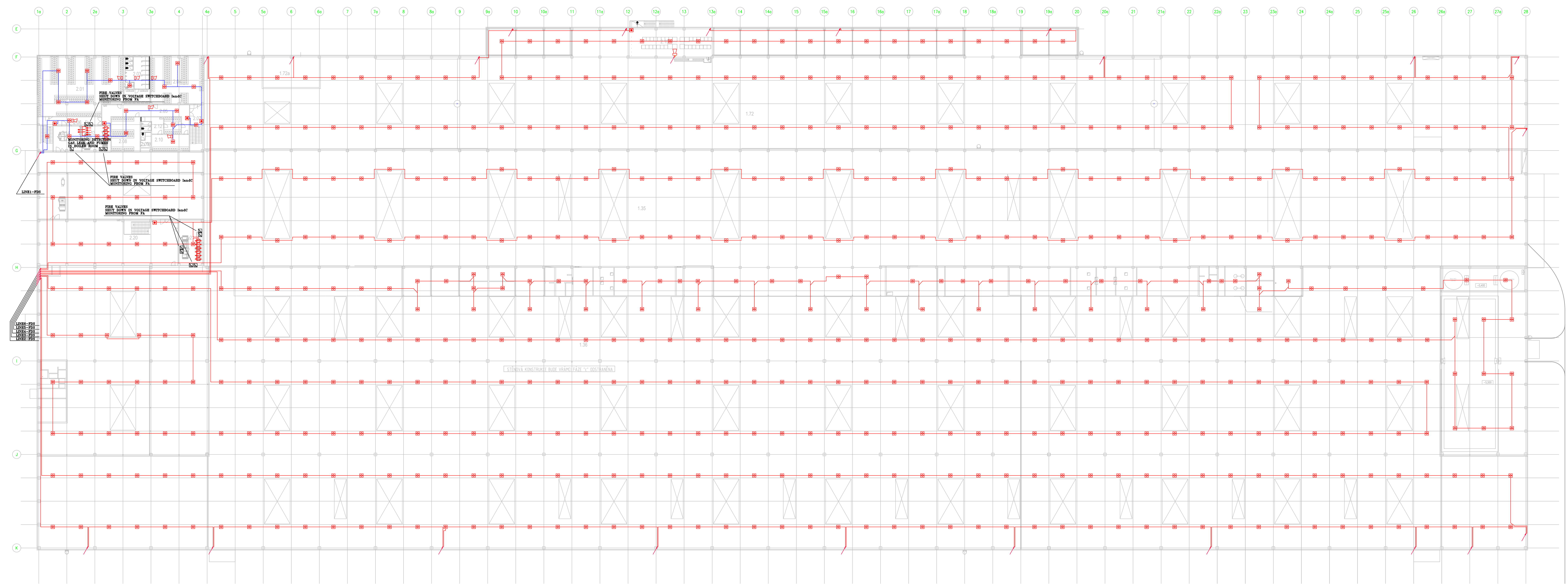
VÝROBNÍ HALA - 1NP PRODUCTION HALL - GROUND FLOOR				SO 02
ČKČL ITEM	ÚČEL MÍSTNOSTI USE OF ROOM	PLOCHA AREA [m²]	ŠÍŘKA VÝŠKA CEILING HEIGHT [m]	
1.72a	NABÍJEČ STANICE BATTERY CHARGING ROOM	80,5	6,7*	
1.73	ROZVOJNA NN LV SUBSTATION	108,6	3,6*	
1.74	PRACHEVÉ FILTRY DUST COLLECTOR	76,0	7,5*	
1.75	NEOBSAŽENO NOT USED	-	-	
1.76	ROZVOJNA VN HV STATION	35,8	3,5	
1.77	TRAFOSTANICE T5 TRANSFORMER ROOM T5	35,8	3,5	
1.78	TRAFOSTANICE T6 - REZERVA TRANSFORMER ROOM T6 - RESERVE	34,4	3,5	
1.79	PŘEČERPAVACÍ STANICE CHLAZENÉ VODY COOLING WATER PUMPING STATION	104,6	3,6*	
1.80	PŘEČERPAVACÍ STANICE OPLACH. VODY PUMPING STATION TO PWIP	48,5	3,6*	
1.81	ÚNIKOVÁ CHODBA ESCAPE CORRIDOR	7,8	2,5	
1.82	SKLAD NÁHRADNÍCH DÍLŮ SPARE PARTS STORAGE	51,9	3,6*	
1.83	ROZVOJNA NN LV SUBSTATION	110,9	3,6*	
1.84	PRACHEVÉ FILTRY DUST COLLECTOR	72,9	7,5*	
1.85	WC MUŽI TOILET MALE	13,2	2,5	
1.86	WC ŽENY TOILET FEMALE	5,0	2,5	
1.87	CHODBA CORRIDOR	3,6	2,5	
1.88	DENNÍ MÍSTNOST DAY ROOM	45,5	3,0	
1.89	EXPEDICE FINAL EXPEDITION	721,1	5,3*	
1.90	SKLAD ODPADŮ (VENKOVNÍ) WASTE STORAGE (OUTSIDE)	362,1	5,1*	

LEGEND OF FIRE ALARM

- CENTRAL OF FA
- EX BATTERY
- OPTICAL-SMoke DETECTOR IN EX ENVIRONMENT
- BATTERY DETECTOR
- FA SWITCHBOARD
- CONVENTIONAL ACUSTIC HORN
- ADDRESS ACUSTIC HORN
- BACK-UP SUPPLY SOURCE 24 V
- KOPPLER TB881S
- TB881A module of technical alarm
- FET receiver-supplier 220V AC
- LINE CABLE OF FA- JSTYTY (INDOR)
- LINE CABLE OF FA- JSTYTY (INDOR) TO EX ENVIRONMENT
- LINE CABLE OF FA- JE-HOSPIL-BU FETB881S-ESD (INDOR), ROUTE P15-B
- LINE CABLE OF JSTYTY- TB881A module 8 SPT (INDOR), ROUTE P15-B
- CABLE TO CONNECT SUPPLY TO TECHNOLOGY+LINE+V+INDOR+ROUTE P15-B
- COLLECTOR ESSENTIAL TO CONNECT SUBSTATIONS, ROUTE P15-B
- KOPPLER CABLE SUPPLY- 1-CONE-V+2-2,5, ROUTE P15-B
- LV CONNECTION 220V AC 1-CONE-V+2-2,5



FIRE ALARM FIRST FLOOR AND CEILING, Sc1:250



VÝROBNÍ HALA 2 HP PRODUCTION HALL - FIRST FLOOR		S0 02	
OBJ. ITEM	CEL. MÍSTNOST USE OF ROOM	PLOŠKA AREA [m²]	VEŠTĚLA VÝŠKA CEILING HEIGHT [m]
2.01	SÁTKY MUŽI LOCKERS MEN	223,7	3,0
2.02	UMÝVACOVNA PŘEDNÍ MEN - SINK ANTE-ROOM	16,4	3,0
2.03	SPRCHOVÝ + WC SHOWERS + TOILETS MEN	33,6	2,5
2.03a	OKLIDOVÁ MÍSTNOST CLEANING ROOM	2,8	2,5
2.04	SÁTKY MUŽI LOCKERS MEN	116,6	3,0
2.05	CHODBA CORRIDOR	55,5	3,0
2.06	CHODBA CORRIDOR	42,6	3,0
2.07	CHODBA CORRIDOR	29,1	3,0
2.08	SÁTKY ŽENY LOCKERS WOMEN	44,3	3,0
2.09	SPRCHOVÝ + WC ŽENY SHOWERS + TOILETS WOMEN	7,3	3,0
2.10	HYGIENICKÁ SÁTKA MUŽI HYGIENIC LOCKERS MEN	28,0	3,0
2.11	OSTA SÁTKA MUŽI HYGIENIC LOCKERS MEN	13,0	3,0
2.12	SPRCHOVÝ + WC SHOWERS + TOILETS MEN	15,1	2,5
2.13	STROJOVNA VZT HVAC TECHNICAL AREA	32,2	3,3*
2.14	KOTELNA STEAM ROOM	31,7	3,3*
2.15	ROZVODNA NN LV SUBSTATION	111,4	3,5*

2.20	SKLAD PRO LABORATOR STORAGE FOR LABORATORY	290,1	3,3*
2.21	STROJOVNA VZT HVAC TECHNICAL AREA	49,1	3,3*

LEGEND OF FIRE ALARM

- CENTRAL OF FA
- EX BARRIER
- OPTICAL-SMoke DETECTOR IN EX ENVIRONMENT
- OPTICAL-SMoke DETECTOR
- BUTTON DETECTOR
- FA SWITCHBOARD
- CONVENTIONAL ACOUSTIC HORN
- ADDRESSED ACOUSTIC HORN
- BACK-UP SUPPLY SOURCE 24 VV
- KOPPLER 788613
- KBTAL module of technical alarm
- FCT masterbus-toppler 230V AC

LINE CABLE OF FA- JESTĚ (1x2x0,8)

LINE CABLE OF FA- JESTĚ (1x2x0,8) TO EX ENVIRONMENT

LINE CABLE OF FA- 4x0,8x0,36 PE/NE/ENO-EN (1x2x0,8) ROUTE P15-B

LINE CABLE OF HORNS- PRÁVNÍKOVÁ R DPE (1x2x0,8) ROUTE P15-B

CABLE TO CONNECT KOPPLER TO TECHNOLOGIST-1-DONE-V-122x0,8 ROUTE P15-B

COLLECTOR ESSENCE TO CONNECT SUBSTATIONS ROUTE P15-B

KOPPLER CABLE SUPPLY-1-DONE-V-3x2,5 ROUTE P15-B

LV CONNECTION 230V AC 1-DONE-V-3x2,5

